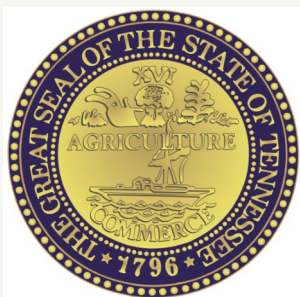


FY 2010 *Annual Report* of Tennessee's
319 Nonpoint Source Grant Program



TENNESSEE
DEPARTMENT OF
AGRICULTURE
WATER RESOURCES
PROGRAM



Restoring....

Protecting...

Tennessee's Water Resources

Submitted to US EPA, Region IV—July 8, 2011



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Cover photo courtesy of Leslie Colley, the Nature Conservancy showing the Duck River, Marshall County, Tennessee.

Introduction

The Tennessee Department of Agriculture (TDA) manages the 319 Nonpoint Source Program (NPS) with approval and oversight of the US Environmental Protection Agency. This report is required under the provisions of the grant award to TDA.

Today, nonpoint source (NPS) pollution is the nation's largest source of water quality problems. It's the main reason that approximately 40 percent of our surveyed rivers, lakes, and estuaries are not clean enough to meet basic uses such as fishing or swimming. NPS pollution occurs when water runs over land or through the ground, picks up pollutants, and deposits them into rivers, lakes, and coastal waters or introduces them into ground water. NPS pollution is widespread because it can occur any time activities disturb the land or water.

To address this diffuse type of pollution, congress established the Nonpoint Source Program, funded by the USEPA through Section 319 of the Clean Water Act. The Tennessee Department of Agriculture administers the Nonpoint Source Program in Tennessee on behalf of USEPA. This program provides funds to states, territories and Indian tribes for installing Best Management Practices (BMPs) to stop NPS pollution; providing training, education, and demonstrations; and monitoring water quality.

The TDA-NPS Program is non-regulatory and promotes voluntary, incentive-based solutions. The program is a cost-share program, meaning that it pays for 60% of the cost of a project. It is the responsibility of the grantee to provide the remaining 40%, usually in cash and "in-kind" services. It primarily funds two types of projects:

1. **BMP Implementation Projects** improve an impaired waterbody, or prevent a non-impaired water from becoming placed on the 303(d) List. Projects of this type receive highest priority for funding. All projects involving BMPs must be based on an approved "Watershed Based Plan".

2. **Educational Projects** funded through TDA-NPS raise awareness of practical steps that can be taken to eliminate NPS pollution. Projects funded can either have a statewide, general public aim or can focus in on local, targeted audiences with specific messages.

No funds from the Nonpoint Source program are given directly to individual landowners. All grant money is awarded to organizations/entities that administer and oversee the local project. Eligible applicants include non-profit organizations, local governments, state agencies, soil conservation districts, and universities. These organizations then can enter into work agreements with individual landowners to reimburse them for work done on their land. All payments made with grant funds are on a reimbursement basis.

Programs Highlights from FY2010

Significant Grant Milestones in Fiscal Year 2010:

- ✦ The FY2004 grant expired on September 30, 2010. The Closeout Report was submitted on December 20, 2010.
- ✦ The FY2010 grant was awarded on August 10, 2010.

FFY2010 Spending

In FFY2010, the Tennessee Nonpoint Source program (NPS) again demonstrated the ability to put federal 319 grant money on the ground in an effective way. During FFY 2010, 319 money was spent from federal grants received in every year from FFY2004 through FFY2010. From across all of the grant years, a total of approximately \$3,020,274 was spent in FFY2010. The following table breaks down how the money was spent.

319 Program Spending in Tennessee – FFY2010

Nature of Expense	Amount of 319 Dollars Spent
NPS Program Management	\$ 903,650
Watershed Restoration Projects (BMPs)	1,677,480
Educational Projects	429,506
Planning Projects (i.e., Watershed Based Plans)	9,638
TOTAL:	\$ 3,020,274

That total closely approximates what Tennessee typically receives in annual 319 funding. Program Management costs reflects salaries and benefits for 13.5 FTEs, travel, supplies, and indirect costs. The total for Planning Projects is from a time when funding was provided for groups that wanted/needed to write a Watershed Based Plan. Funding for those type projects was stopped several years ago and this small total represents the very end of a few of those last, remaining contracts.

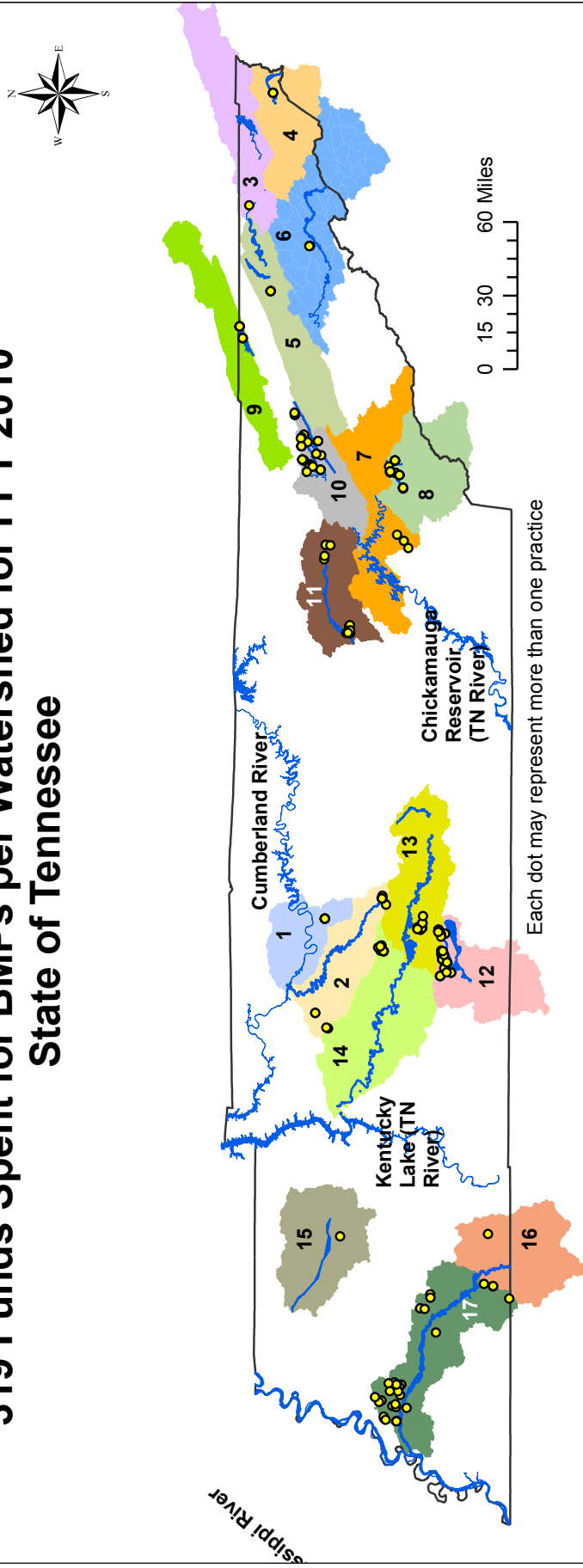
FFY2010 Grant Award

The Tennessee NPS Program received \$3,075,400 in the FFY2010 grant award from USEPA. In response to the FFY2010 *Request for Proposals*, the Tennessee NPS program received twenty-five proposals that requested a grand total of \$6,200,876.6 in grant funds. Obviously, the level of competition for grant funds was high and not all of the projects that applied could be funded. This is especially true once Program Management costs of \$903,650 were taken off of the top. That left \$577,050 to fund "Base" projects and \$1,594,700 to fund "Incremental" projects.

The following table provides a list of all projects funded from the FY2010 grant and how much grant funding each received.

Name of Applicant	Name of Project	319 Grant Money Allocated
Base Projects (total funding of \$577,050)		
TVA	Tennessee Growth Readiness	\$ 74,000.00
Tennessee RC&D Council	Tennessee Envirothon	33,000.00
TN Dept. of Transportation	Permanent Erosion Prevention and Sediment Control BMP Training Facility	98,000.00
TN Dept. of Environment and Conservation	Water Quality Monitoring	207,050.00
Tennessee Student Environmental Alliance	Reducing NPS Pollution through Education and BMP Demo. Sites at schools in Chattanooga Area Watersheds	90,000.00
TDA – Division of Forestry	Forestry Water Quality BMPs Education and Technical Assistance	75,000.00
Incremental Projects (total funding of \$1,594,700)		
Claiborne County Soil Conservation District	Davis Creek Watershed Restoration Initiative	\$ 200,000.00
Cumberland River Compact	Cathy Jo Branch Subwatershed – Stormwater: Shared Consequences, Shared Responsibilities	250,000.00
Town of Mountain City	Furnace Creek Watershed Implementation Project	472,700.00
Obed Watershed Community Alliance	Obed Watershed Management Plan Implementation	62,000.00
The Middle Nolichucky Watershed Alliance	Lower Nolichucky Sediment Reduction Project	90,000.00
Dickson County Board of Education	Creekwood High School – Jones Creek Restoration Project	70,000.00
Lauderdale County Soil Conservation District	Cold Creek Restoration Project	400,000.00
Tennessee Environmental Council	Rutherford Creek Phase II Restoration Plan Implementation	50,000.00

319 Funds Spent for BMPs per Watershed for FFY 2010 State of Tennessee



1 - Lower Cumberland	05130202 - \$30,000.00	10 - Lower Clinch	06010207 - \$89,329.57
2 - Harpeth River	05130204 - \$67,168.34	11 - Emory	06010208 - \$60,126.71
3 - South Fork Holston	06010102 - \$34,887.00	12 - Lower Elk	06030004 - \$108,896.72
4 - Watauga	06010103 - \$8,526.00	13 - Upper Duck	06040002 - \$32,031.43
5 - Holston	06010104 - \$20,269.00	14 - Lower Duck	06040003 - \$35,906.00
6 - Nolichucky	06010108 - \$2,534.00	15 - South Fork Obion	08010203 - \$24,381.75
7 - Watts Bar	06010201 - \$2,998.00	16 - Upper Hatchie	08010207 - \$25,829.10
8 - Lower Little TN	06010204 - \$28,389.44	17 - Lower Hatchie	08010208 - \$288,847.34
9 - Powell	06010206 - \$17,116.51		

Approximately 219 BMPs were installed in FFY 2010. The total amount of 319 funds spent on BMPs was \$877,236.91. The dollar figures on this page only reflect 319 funds spent on actual, on-the-ground BMPs.

Load Reductions of projects with BMPs for FFY10 using STEPL Model

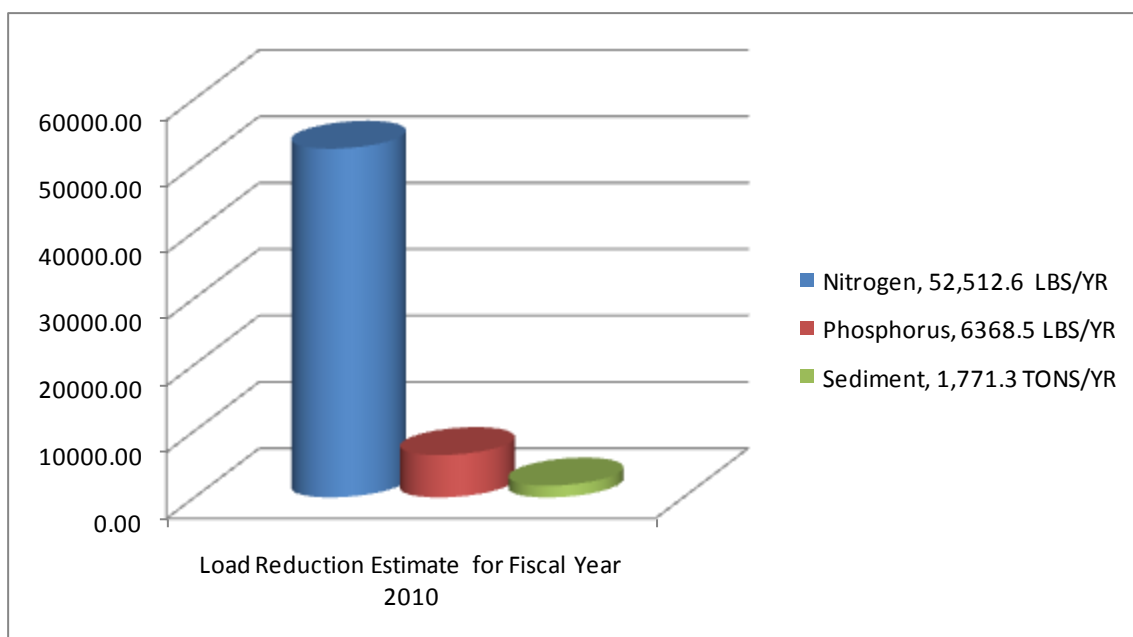


Chart 1.

Approximately 219 BMPs were installed throughout the state in FFY10. Load Reductions estimates are indicated in the chart above. Data derived from GRTS entries and database query dating from October 1, 2009 and September 30, 2010.

NOTE: Data units for sediment is in TONS/YR

2010 Regional Nonpoint Source Managers Meeting

The Tennessee Nonpoint Source Program hosted the 2010 Region IV Nonpoint Source Conference in Nashville on September 14-16, 2010. The meeting was held at Ellington Agricultural Center, the campus of the Tennessee Department of Agriculture, in the Ed Jones Auditorium. Total attendance was excellent and varied some from day to day, but ranged between 30 and 40 people each day. There was at least one representative there from each Region IV state, with most states sending multiple staff members. There were also many Nonpoint Source staff members from the EPA Region IV office as well. The photo **below** is of the group one afternoon.



Attendees of the 2010 Region 4 Nonpoint Source Conference held at Ellington Agricultural Center Nashville, Tennessee, September 14-16, 2010

The meeting started with an address from Jim Giattina, Director of EPA Region IV's Water Protection Division. Following that, Tom McGill updated the states on *Priorities of the Region IV Nonpoint Source Program*. The rest of the first day was taken up with each state giving an update of their program and any issues they were facing. Other main topics for the second two days of the conference were the process of updating state's NPS Management Plans, the procedure each state uses to review and select project proposals, the connection between NPS BMPs and urban stormwater BMPs, and applications/tools for Grants Reporting and Tracking System (GRTS).

The second day of the meeting was partially filled with a field trip to see local projects and practices that had been paid for with 319 money through the Tennessee NPS program. The trip started with a walking tour up and down Seven Mile Creek on the Ellington campus, led by Joey Woodard of the Tennessee Stream Mitigation Program. 319 funds have been used here to implement a variety of streambank restoration work to both clean up this impaired stream and to protect the habitat of the federally-listed endangered species, the Nashville crayfish. The next two stops were both in the Cathy Jo Branch subwatershed at the Nashville Zoo and at Croft Middle School to see various stormwater practices. Jim Littlejohn of Littlejohn Engineering Associates gave a presentation at the zoo and Mekayle Houghton of the Cumberland River Compact guided us around the school property. The final stop was in downtown Nashville to see an innovative green roof on top of the Westview condominiums. This project was described by the man who installed and maintains the garden there, Mike Berkley of GroWild, Inc. Actually, the final stop was to eat dinner at Monell's in the Germantown section of Nashville and was likely everyone's favorite part of the trip.

Award-winning Project

As is the case almost every year, another project that received funds as part of the NPS program has won an award this past year. The following project won a Governor's Environmental Stewardship Award from the Tennessee Department of Environment and Conservation in 2010.



2010 Award Presentation (l-r) TDEC Commissioner Jim Fyke; John King, Teresa King and Stephen King, Owners/Operators; TDEC Deputy Commissioner Paul Sloan

The King Dairy Farm has been in existence since 1774. Today, the farm has more than 180 cows, which are milked twice daily and average over 20,000 pounds of milk per cow each year. Almost all of the feed for the herd is produced on the farm and they incorporate conservation best management practices into their crop production. Corn silage yields are exceptionally high because they practice conservation tillage to reduce soil erosion. Because 100 percent of the farm's confined animal and milking parlor wastes are stored and kept out of the nearby stream and lake, the farm is able to use the waste as fertilizer to help reduce the amount of nutrients purchased.

A 2,600-foot underground pipeline was also installed to deliver this valuable waste to cropland through an irrigation system. The farm also practices crop rotation and winter cover to control runoff, soil erosion and to improve soil. The farm installed a new energy efficient, variable-speed vacuum pump for its milking parlor and continually makes environmental improvements each year.

Approximately \$18,670.00 from Tennessee's Agricultural Resource Conservation Fund (ARCF) was used fund the Kings Dairy Farm project. ARCF dollars are used to match our 319 program.



TDA-NPS Program Vision Statement

TDA-NPS Program will be the most effective provider of 319 funding in the nation as we seek to restore and protect Tennessee's water resources from nonpoint sources of pollution.

TDA-NPS Program Mission Statement

*The mission of the TDA-NPS Program is to:
Measurably reduce nonpoint source pollution in Tennessee,
Measurably improve Tennessee's water quality,
Continuously strengthen and expand partnerships, and
Increase the water resources stewardship of Tennessee's citizens.*

TDA-NPS Program Long Term Goals

Long Term Goal 1.

Hold regularly scheduled meetings with stakeholders, to create new partnerships, strengthen existing partnerships and to foster greater trust, commitment and accountability.

Long Term Goal 2.

Fully implement all developed TMDLs for nonpoint sources in compliance with existing regulations, policies, or agreements by 2015.

Long Term Goal 3.

Restore all waters impaired by nonpoint sources that are listed on the 1998 303(d) List to the condition of fully supporting their designated uses by 2015, in cooperation with local, state and federal partners.

Long Term Goal 4.

Beginning in 2006, through regulatory and non-regulatory means, prevent previously unlisted waters from being included on the 303(d) List because of nonpoint source impairments.

Long Term Goal 5.

Improve the knowledge of stakeholders and citizens concerning the origins, magnitude, and prevention of nonpoint source pollution.

Long Term Goal 6.

Through the process of continuous improvement, routinely assess all programmatic functions of the TDA-NPS Program in order to maximize efficiency, decrease the bureaucratic burden and increase the numbers of participants in the program.

Long Term Goal 7.

Use the maximum allowable percentage of funding annually to assist partners with water quality monitoring and assessment, for the duration of the 319 program.

Project Budget Summary of Active Projects—as of 6/24/11

Grantee Name—Project Name	Amount Awarded (\$)	Balance (\$)	Expiration Date
Anderson County SCD - <i>Bullrun Creek Restoration</i>	\$514,350.00	\$212,161.00	8/31/2011
Appalachian RC&D - <i>Roan Creek Restoration</i>	\$350,000.00	\$291,885.79	7/15/2014
Austin Peay State University - <i>Project WET 2010</i>	\$244,000.00	\$217,727.94	12/31/2014
Blount County SCD - <i>Baker & Centenary Creeks Restoration</i>	\$300,000.00	\$228,137.73	1/15/2015
Boone Watershed Partnership - <i>Gap Branch Restoration</i>	\$18,000.00	\$18,000.00	10/31/2014
Boone Watershed Partnership - <i>Sinking Creek Restoration</i>	\$300,000.00	\$255,006.34	9/30/2013
Chickasaw-Shiloh RC&D— <i>Dry Creek & Hatchie River</i>	\$103,256.60	\$0.00	9/30/2010
Chickasaw-Shiloh RC&D— <i>Three Creek Restoration</i>	\$280,485.59	\$0.00	9/30/2010
City of Athens - <i>North Mouse Creek Restoration</i>	\$230,000.00	\$147,297.52	10/31/2014
City of Chattanooga - <i>Lower TN Watershed Academy</i>	\$57,500.00	\$56,500.00	1/31/2013
City of Kingsport - <i>Madd Branch - Phase II</i>	\$67,440.00	\$62,350.00	8/15/2011
Claiborne County SCD - <i>Davis Creek Restoration</i>	\$200,000.00	\$176,138.00	9/30/2015
Clinch-Powell RC&D - <i>East TN Grazing Lands Conservation</i>	\$100,000.00	\$86,108.88	12/31/2014
Clinch-Powell RC&D - <i>Mulberry/Little Mulberry Restoration</i>	\$153,511.00	\$109,017.59	2/15/2014
Clinch-Powell RC&D - <i>TN Grazing Lands Conservation</i>	\$100,000.00	\$73,818.66	2/28/2014
Cumberland Region Tomorrow - <i>Quality Growth Tool Box Pilot Project</i>	\$99,715.86	\$4,849.05	5/31/2012
Cumberland River Compact - <i>Cumberland R. Watershed Meetings Process</i>	\$48,000.00	\$48,000.00	9/30/2014
Cumberland River Compact - <i>Cumberland R. Watershed Meetings Process</i>	\$46,000.00	\$3,239.16	8/31/2012
Cumberland River Compact - <i>Cumberland R. Watershed Meetings Process</i>	\$48,650.00	\$27,680.20	8/31/2013
Dickson County Board of Education - <i>Creek Wood School Restoration</i>	\$70,000.00	\$70,000.00	10/31/2015
First TN Development District - <i>Cash Hollow Creek WS Plan</i>	\$20,000.00	\$3,364.54	8/31/2010
Giles County SCD - <i>Robertson Fork Creek</i>	\$284,000.00	\$49,863.97	10/15/2014
Giles County SCD - <i>Robertson Fork WS Plan</i>	\$20,000.00	\$0.00	10/31/2011
Greene County SCD - <i>College Creek Restoration</i>	\$310,000.00	\$228,106.00	12/31/2014
Harpeth River WS Association— <i>Headwaters Implementation</i>	\$240,200.00	\$0.00	8/31/2011
Harpeth River WS Association— <i>Jones Creek Implementation</i>	\$127,000	\$0.00	8/31/2011
Hawkins County SCD - <i>Caney Creek Restoration</i>	\$70,000.00	\$44,250.00	6/15/2014
Hull York Lakeland RC&D - <i>Post Oak Creek WS Plan</i>	\$20,000.00	\$7,770.49	9/30/2011
Ijams Nature Center - <i>Stock Creek WS Plan (Incr.)</i>	\$20,000.00	\$450.66	9/15/2010
Lauderdale County SCD - <i>Cold Creek Restoration</i>	\$400,000.00	\$352,839.97	9/30/2015
Middle Nolichucky WS Alliance - <i>Lower Nolichucky Sediment Reduction</i>	\$90,000.00	\$84,801.00	2/15/2016
Morgan County SCD - <i>Crooked Fork Restoration</i>	\$400,000.00	\$206,408.88	10/31/2012
Middle Tennessee State University - <i>Discover the Waters of TN</i>	\$71,535.00	\$926.39	9/15/2013
Obed Watershed Community Assoc. - <i>Crossville Headwaters Restoration</i>	\$109,965.00	\$25,843.84	9/30/2013
Obed WS Community Assoc. - <i>Crossville Headwaters Restoration-Phase II</i>	\$62,000.00	\$58,165.53	10/15/2015
Southeast TN RC&D - <i>Conasauga River TMDL Implementation</i>	\$275,000.00	\$267,524.00	1/31/2015

Continuation of Project Budget Summary of Active Projects

Grantee Name—Project Name	Amount Awarded (\$)	Balance (\$)	Expiration Date
Tennessee Department of Agriculture - <i>Forestry BMP Training</i>	\$75,000.00	\$75,000.00	9/30/2011
TN Dept of Environment & Conservation/Water Pollution Control - <i>Monitoring/TMDL (Incr.)</i>	\$318,940.00	\$0.00	12/31/2010
TN Dept of Environment & Conservation/Water Pollution Control - <i>NPS Watershed Monitoring</i>	\$50,000.00	\$50,000.00	12/31/2013
TDEC/WPC/Abandoned Mine Lands - <i>Crab Orchard Creek WS Plan (Incr.)</i>	\$409,200.00	\$0.00	2/28/2011
Tennessee Environmental Council - <i>Rutherford Creek Restoration</i>	\$150,000.00	\$0.00	9/30/2012
Tennessee Resource Conservation & Development Council - <i>Tennessee Envirothon</i>	\$30,000.00	\$6,210.58	1/15/2011
Tennessee Valley Authority— <i>TN Growth Readiness—Phase II</i>	\$79,000.00	\$0.00	10/31/2009
The Nature Conservancy - <i>Big Rock Creek (Incr.)</i>	\$500,000.00	\$48,264.61	9/30/2011
Town of Mountain City - <i>Furnace Creek Watershed</i>	\$472,700.00	\$462,834.75	9/30/2015
Union County SCD - <i>Hinds Creek WS Restoration</i>	\$417,300.00	\$270,742.39	1/15/2014
The University of Tennessee - <i>Beaver Creek Restoration</i>	\$919,385.00	\$753,323.13	12/15/2012
The University of Tennessee - <i>TN Yards & Neighborhoods Program</i>	\$92,000.00	\$24,871.35	10/15/2013
The University of Tennessee Agricultural Extension Service - <i>Oostanaula Creek Restoration</i>	\$155,400.00	\$148,791.21	1/31/2015
The University of Tennessee Agricultural Extension Service - <i>Pond Creek WQ Improvement (Incr.)</i>	\$241,500.00	\$177,331.40	9/30/2012
The University of Tennessee Agricultural Extension Service - <i>Restoration Riparian Zone Harpeth River Watershed</i>	\$50,000.00	\$11,467.17	10/15/2013

Project Summaries for FY2010

(In alphabetical order, by grantee)

GRANTEE: Anderson County Soil Conservation District

PROJECT NAME: Bullrun Creek Restoration

GRANT YEAR: FY2006

WEBSITE: <http://www.tnwatershedconference.com/repository/2010/BullRunCreek.pdf>

The Bullrun Creek Restoration Partnership has had a busy year, especially with repairing failing septic systems. There have been 9 septic systems repaired with cost share amounting to \$28,801.00. There have been 7,573 feet of cross fencing installed with cost share amounting to \$9,986.00. One water facility with 10 feet of pipeline on a 26 x 26 heavy use area in the amount of \$4,184.00 in Union County. Also five acres was seeded with cost share being \$1,114.00.



Newly installed Septic System at home of Bobby Cox



Terri Bailey Septic Photo 1



Terri Bailey Septic Photo 2

GRANTEE: Appalachian Resource Conservation & Development Council

PROJECT NAME: Roan Creek Restoration

GRANT YEAR: FY2008

WEBSITE: <http://www.appalachianrcd.org/>



The first of the site specific restorations, the John Shull Restoration Project, has been designed, permitted, constructed, and planted. This successful project has used cost-share funds from EQIP and 319. Approximately 1,620 linear feet of stream was restored, through the fencing out of cattle, natural channel design, and riparian buffer planting. Another project currently underway is the livestock exclusion and riparian planting of approximately 1,000 linear feet of Cabbage Creek (a tributary to Roan) at the Earl Taylor Property. As with the previous landowner, this project involves the coupling of EQIP and 319 funds. Two cattle crossings have been installed as well as an EQIP funded watering tank with fencing and planting to occur this fall. Additionally, all permits have been obtained for the Johnson County Highway Department (JCHD) Streambank Stabilization projects (2 sites on Forge Creek + 1 site on Roan Creek). Brushy Fork Environmental Consulting (BFEC) intends to work with the JCHD at a 50/50 cost-share to stabilize streams and enhance riparian buffers. The JCHD intends to construct these measures in early fall. BFEC has assessed and surveyed the project reaches and will be overseeing site construction.

Over the past year, important relationships with two major landowners in the Roan Creek Watershed have been established: 1) Maymead Farm Restoration: BFEC staff met with the Vice President of Maymead (Wiley Roark) in March of 2010. The Maymead Farm is one of the largest farms located in the Subject Watershed. Components of this potential project will likely include: streambank stabilization, riparian planting, livestock exclusion (fencing), and alternative watering. 2) Earl Shull Restoration Project: Mr. Shull received a pamphlet mailed by BFEC in the spring of 2010 and contacted us directly. Mr. Shull is interested in: stabilizing eroding streambanks, excluding cows from direct riparian areas (fencing), finding alternative watering sources, and riparian planting. Mr. Shull has been the first to show interest in signing up for a conservation easement and using the easement value as a project match. Earl signed the 319 cost-share agreement on 4/1/2010. Mr. Shull has since passed away and BFEC is making every effort to meet with the family and overcome the loss of this significant landowner. Finally, other landowner interest in 319 cost-share stream restoration includes:

1) Sullivan Streambank Stabilization: Mr. Robert Sullivan contacted BFEC to help him stabilize his residential site along Roan Creek. Currently, the process of meeting his two additional neighbors to stabilize approximately 100 linear feet of Roan Creek is underway. (Mr. Sullivan owns approximately 600 linear feet).

2) Tedder Streambank Restoration: Ms. Betty Tedder has contacted BFEC to assess her streamfront property on Forge Creek. Ms. Tedder has over 500 linear feet of stream with little to no riparian buffer that is actively eroding her front yard. A cost-share agreement is being generated for this landowner's review.

3) Other potential landowners are actively being sought to participate in the program with positive results thus far. The successful implementation of this year's fieldwork has resulted in increased interest among local landowners with more



John Shull Property :

Natural Channel Design structures such as rock vanes (above) were installed to direct the thalweg away from the bank in order to prevent further erosion and sedimentation.

Cows were also fenced out of the area and the streambank was planted with a native riparian buffer.



Johnson County Highway Department:

All environmental permits have been obtained in order to begin construction on several severely eroding streambanks near county roads within the Roan Creek Watershed.



Earl Shull Property:

Steep clay banks, cattle in the streams, and a lack of riparian buffer all contribute to the degraded streambanks throughout this landowner's large tract of land.

This project awaits the determination of whether or not conservation easements can be used as a landowner cost-share match.



Betty Tedder Property on Forge Creek:

Several landowners with stream front property have contacted BFEC with interest in restoration assistance based on the brochure created and distributed early this year.

GRANTEE: Blount County Soil Conservation District
PROJECT NAME: Baker Creek & Centenary Creek Restoration Initiative
GRANT YEAR: FY2009
WEBSITE: <http://www.blounttn.org/soil/>

Implementation of agricultural best management practices.

Eight, agricultural operators have completed their conservation practices for this reporting period. Six of these operators were located in the priority watersheds within Blount County and the remaining two were located in Loudon County. Additionally, a total of twelve operators within both Counties have been approved for cost-share assistance representing 36% of the grant allocation for this program during the first 9 months. A display booth featuring opportunities for cost-share assistance has been showcased at four individual events across Blount County. A postcard featuring agricultural best management practices has been developed and will be sent to landowners within the priority watersheds as part of a targeted mailing to further escalate participation in this program.



*Critical Area Treatment—**Before:***



*Critical Area Treatment—**After:**
with associated checks and erosion control fabric*

Septic System Repair and Restoration for Low-Income Households.

One septic system has been repaired during this timeframe and three other systems are pending. The parameters of the completed project have been documented. Grant partners have been advised to comment on any known areas of failed systems within the Baker Creek Watershed in order to target grant funding in smaller sub-sheds.

Assess Condition of Stormwater Detention Facilities.

A Geographical Information System (GIS) layer has been utilized to identify subdivisions with existing detention basins. A tour of these sites will occur in late October 2010 in order to identify potential retention basins for retrofits.

Public listening sessions for input into the implementation of the watershed plan.

Multiple planning meetings have been held regarding this aspect of the grant. The listening sessions are expected to occur in late October 2010 until early November 2010. A targeted mailing within the priority watersheds will be used to market this aspect of the grant.

More Agricultural Best Management Practices:



*Heavy Use Area Protection—**Before:***



*Heavy Use Area Protection—**After:***

Conclusion:

To date, four planning meetings among grant partners have occurred as part of an adaptive management strategy to fulfill all aspects of the current grant as well as to prioritize other watershed management activities as contained within the watershed plan for Baker, Ninemile, and Centenary Creek Watersheds.

GRANTEE: Boone Watershed Partnership, Inc.
PROJECT NAME: Gap Branch Restoration Project
GRANT YEAR: FY2009
WEBSITE: <http://boonewatershed.com/>

The Gap Branch (Gap Creek, as it is known to residents) Restoration Project to address a Total Maximum Daily Load for habitat loss began November 1, 2009. The portion of Gap Creek that is being addressed is 1-2 miles located within the City of Elizabethton corporate limits. It should be noted here that there are 15.93 miles of impaired stream/tributary that affect Gap Creek, many of which are located outside of the city limit. Within this project area the creek flows through agricultural, residential and commercial land uses before it reaches the Watauga River, (HUC 06010103) at approximate river mile 22. The city prepared nice maps and generated an address list for a mailing to notify landowners on the creek of a public meeting. A press release was done and a public meeting was held December 14, 2009 and was not well attended.

On September 9, 2010, the Technical Advisory Committee met to discuss the project. Using the City of Elizabethton's Gap Creek Outfall Mapping, and preliminary work to identify project areas, the plan is to approach homeowners with proposed stabilization or riparian buffer projects. Specifically, project locations have been identified at outfalls numbered: GC-002, GC-003, GC-004, GC-005, GC-006, GC-007, GC-022, GC-023, GC-024, GC-028. Through agreement with individual property owners, City personnel will assist with this effort, in addition to contractors. The schedule for this project anticipates a completion date of December 2011.



GC-003 Stabilization needed.



GC-004 Stabilization needed.



GC-005 Riparian buffer needed.



GC-023 Riparian buffer needed.

GRANTEE: Boone Watershed Partnership, Inc.
PROJECT NAME: Sinking Creek Restoration Project
GRANT YEAR: FY2008
WEBSITE: <http://boonewatershed.com/>

The Sinking Creek Restoration Project to address a Total Maximum Daily Load for fecal coliform bacteria began October 1, 2008. Sinking Creek is approximately 9.8 miles long and is located in Washington County, the City of Johnson City, and Carter County. It flows through agricultural (livestock) areas, commercial, mixed use, and residential areas before sinking and re-emerging in the Watauga River. Year 2 of the project consisted of a lot of time spent in the community. A total of thirty-three hours were spent visiting residents and agricultural sites. There were 4 special events where information on the Sinking Creek Project was presented. Of course, project updates are given at each Boone Watershed Partnership General Meeting, of which there were three during this reporting period. There were two mail-outs to residents and phone calls were made throughout the year. The result of the investment of this time is convincing the owners of a total of 9 residences on the creek to connect to the sanitary sewer. These properties are located downstream from where the data show the highest spikes in pollutants, including fecal coliform. Additionally, through the assistance of the USDA NRCS office in Carter County, one agriculture project, involving more than 150 acres of pastureland, is underway.

Among many smaller achievements, there are two major accomplishments to report. One is that the operator of the sanitary sewer, the City of Johnson City, has agreed to consider adding sewer line to an area on Sinking Creek Rd. in Carter County. In doing so, the new line will cross two county roads, as well the creek itself. There are at least 3 residents, one with a known septic tank problem, who have expressed interest in connecting to the sewer, and a possibility of at least 2 more that may be served. The second accomplishment is the development of a conservation plan and agreement for the McKeehan farm. This plan includes an improved cattle watering area, spring protection and some fencing. The hope is that the success of this project will draw other similar projects. In the coming year, the project manager and BWP expect to continue the outreach process, as well as follow up with the current contacts and oversight of projects that are currently underway. Namely, the project manager will attempt to reach residents along Catbird Creek that may be using septic tanks. There is at least one agricultural site in Washington County where the owner has expressed interest in pursuing a project for her animals. There were a few lessons learned in the past year, the main one being the challenges associated with reaching plumbers who will do the work on the property owner's side of the sewer connection. Homeowners have had a difficult time getting plumbers to come out and do estimates.

The project manager and BWP are doing diligence to support these efforts as much as possible.

*Watering area on
McKeehan farm*





The proposed conservation plan may include closure of the working lane, so that it is used only on occasion when needed to work or transfer the cattle.



There is a spring under this area that may be piped down to an area that is less impacted by cattle activity.



Work area that maybe piped, a watering source will be identified.

GRANTEE: Chickasaw-Shiloh Resource Conservation & Development Council, Inc.
PROJECT NAME: Dry Creek and Hatchie River Watershed Project
GRANT YEAR: FY2004

WEBSITE: <http://www.tnrcd.org/Envirothon/chickshilo.htm>



The Chickasaw Shiloh RC&D Council had a successful year in the Dry Creek And Hatchie River Tributaries Project. The program was designed to promote better stewardship of the soil and water resources. The goal was to help maintain the integrity of stream courses, reduce the volume of surface runoff, and minimize the movement of pollutants including nutrients and sediment and pesticides.

Through the implementation of Best Management Practices, a significant reduction of pollutants was achieved. During FY 2010, there were 27 Grade Stabilization Structures and 5 Water and Sediment Control Basins that were completed to help stabilize critical eroding areas. Additionally, there were 2300 feet of terraces and diversions constructed. These structures reduced soil erosion, reduce the peak volume of surface runoff, and help prevent the movement of pesticides and nutrients.



Grade Control on the Don Sweat property

Grade Control on the Dennis Lee farm





Grade Control on the Hal Kirkpatrick Farm, Hal Kirkpatrick (left), Doug Woodard SCD Technician (Right)



Grade Control on the John Sneed Farm operated by Peyton and Mathis

GRANTEE: Chickasaw-Shiloh Resource Conservation & Development Council, Inc.
PROJECT NAME: Three Creek Restoration Project
GRANT YEAR: FY2004

WEBSITE: <http://www.tnrcd.org/Envirothon/chickshilo.htm>



The Three Creek Restoration Project got off to a slow start in 2010. Construction was behind schedule because of excessive spring and early summer rain. The program was designed to promote better stewardship of the soil and water resources. The goal was to help maintain the integrity of stream courses, reduce the volume of surface runoff, and minimize the movement of pollutants including nutrients and sediment and pesticides. Even with the excessive spring rains a significant amount of conservation systems installed during the later summer and early fall seasons. During FY 2010 there were 35 Grade Stabilization Structures that were completed to help stabilize critical eroding areas. These structures reduced erosion, reduced the peak volume of surface runoff, and help prevent the movement of pesticides and nutrients. Through the implementation of these structures approximately 809 acres of cropland was benefited.

*Rock Chute along
Porters Creek in
Hardeman County*



*Newly Constructed Grade Control
Structure on the Oliver Voss Farm*



Dwaine Johnston NRCS Soil Conservationist on Parker Farms newly constructed Grade Control Structure



Thomas Queen of Queen Farms with newly Constructed Grade Control Structure



GRANTEE: City of Chattanooga

PROJECT NAME: Lower Tennessee River Watershed Academy

GRANT YEAR: FY2007

WEBSITE: <http://www.chattanooga.gov/>



The City of Chattanooga, Water Quality Program is working with Chattanooga State Technical Community College (CSTCC) and Neighborhood Services on several different activities. On August 30, 2010, Water Quality staff participated in the Neighborhood Services Leadership Institute. Other partnership and outreach activities included coordination with the City Office of Sustainability and the Tennessee Valley Authority. In September of 2010, computer software known as *Moodle* was obtained to be used for the development and implementation of curriculum for the Watershed Academy. CSTCC staff has been working with Water Quality Staff to finalize an outline and to do program development. The Water Quality Staff are also meeting with the City Department of Neighborhood Services to develop and distribute a survey regarding current knowledge of water quality issues.

GRANTEE: City of Kingsport

PROJECT NAME: Madd Branch - Phase II

GRANT YEAR: FY2005

WEBSITE: <http://www.kingsporttn.gov/>



During the period from October 1, 2009 through September 30, 2010 several activities took place, continuing the goal of Phase II-Mad Branch NPS Management Measures Implementation. Beginning in October, 2009, the scope of services was defined and a design/build team was identified to implement Phase I of



the stream restoration portion of the project funded by ARRA stimulus money. The 319 grant funded the signage for Phase I and will serve to help finance Phase II which is targeted to eliminate downstream impediments to flow and replace with low flow channel enhancements. Phase II is slated to be implemented in the February/March, 2011 time frame. A meeting of the Holston River Watershed Alliance was held on September 30, 2010 to showcase the Madd Branch stream restoration project and reemphasize the overlying purpose of improving water quality in the entire watershed.



Signage depicting the Stormwater Treatment device along Madd Branch.



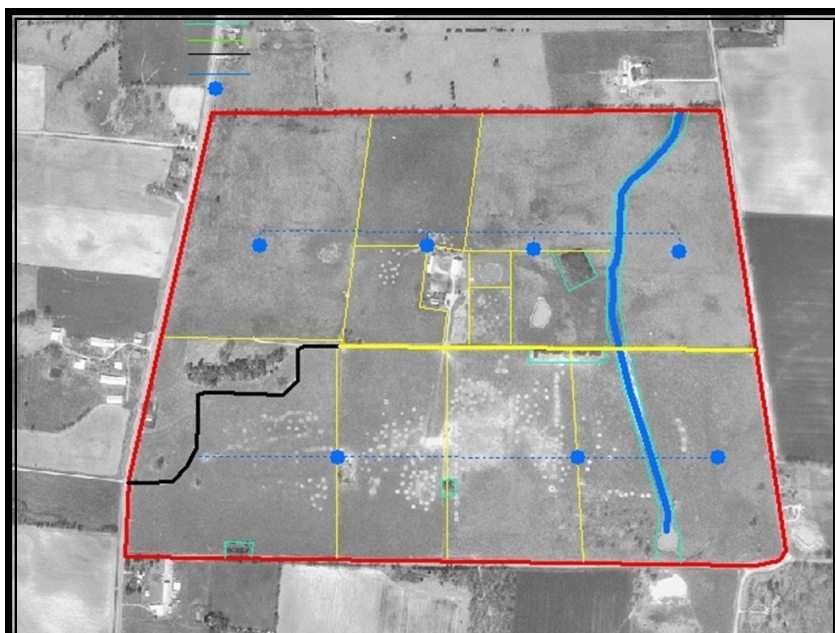
On Saturday, November 7, 2009, members of the ETSU In-Service Learning Program contributed approximately 100 hours of community service by cleaning up Madd Branch stream. Approximately 1,000 pounds of trash were collected and taken to the landfill. This drop from last year's total reflects a downward trend in the amount of trash removed from Madd Branch, indicating that the watershed plan may be influential.

GRANTEE: Clinch-Powell Resource Conservation and Development Council
PROJECT NAME: East Tennessee Grazing Lands Conservation
GRANT YEAR: FY2009
WEBSITE: <http://www.clinchpowell.net/>

The East Tennessee Grazing Specialist position was filled on February 5, 2010. Upon filling the position the office was set up and is housed at the area office in Knoxville, Tennessee. Training began immediately by making site visits all across the state to visit as many different types of conservation practices and concerns as possible to build a strong base for training. Cross fencing, stream bank access, alternative water sources, and heavy use areas were of most concern. Training on Graze and Cowboy Math (grazing formulas) software has also been included in the program. All county NRCS offices have been contacted and made aware of the services that could be provided to their land owners. A strategy was put together with each District Conservationist on how to best reach the producers in the watersheds that were in their counties. Since February, over thirty site visits have been made in the watersheds, two NPS grazing plans contributed to and numerous projects looked at with Graze and Cowboy Math. Along with training and work within the watersheds, the grazing specialist attended the Roane County Grazing Conference and set up a booth to hand out literature and DVD'S, They also attended a holistic management short course in Missouri and the Southeast workshop on warm season grasses. More pasture walks and mini field days are in the planning stages for the fall. Work continues to assist in the improvement of computer software and acquisition of tools to help producers address water quality concerns.



Jeff Lowe, along the Nolichucky River, has installed water points and has planned to lay out multiple paddocks for rotational grazing.



Plan map of the Lowe farm showing where tanks and cross fences are to be added.



Deacon Farm on Watauga has started this project with his own funding but wants to expand with NRCS assistance in future.

The Bishop farm in the Nolichucky Watershed currently has no grazing program but wants to design cross fencing to keep more forage on hand therefore reducing run off to tributaries of the river. NRCS is currently working on a system for the farm.



GRANTEE: Clinch-Powell Resource Conservation and Development Council
PROJECT NAME: Mulberry/Little Mulberry Creek Restoration Project
GRANT YEAR: FY2008
WEBSITE: <http://www.clinchpowell.net/>

After receiving this grant, the original findings of the Upper Powell River Watershed Restoration Plan were reviewed. Once an update was completed, a meeting was held with the Hancock County SCD, Claiborne County SCD, and both NRCS District Conservationists in the area. From these meetings, names of landowners known to be interested in assistance and those in need of contact were obtained. Initiating these contacts has begun. Fourteen farm visits have been completed as well as projects on six of these farms. Efforts have focused on those farms that would benefit water quality the most from the installation of BMP practices.

In addition to these funds and efforts, work with TWRA, TDA, NRCS, and USFWS to secure additional funding in the watershed has begun. Presently landowners who are now willing to complete BMP projects have been found but funding is a large hurdle. However, with a wide array of funding sources it is believed that the BMP needs of the watershed can be met.



*Isaac Hopkins Farm (un-named tributary to Mulberry Creek, project complete):
BMPS completed:
6 watering facilities, 4,835 feet of pipeline, one water well, a heavy use area protection, and 1,900 feet of fence.
Funding Sources: TWRA, USFWS, TN Landowners Incentives Program.*

Darryl Holt Farm (Un-named tributary to Mulberry Creek, project complete)

BMPs completed:

2,640' of pipeline, 40' x 60' heavy use area protection, one watering facility, 200' of farm access road, and 3,473' of fence.

Funding Sources: TWRA, USFWS, EPA 319, and TDA.

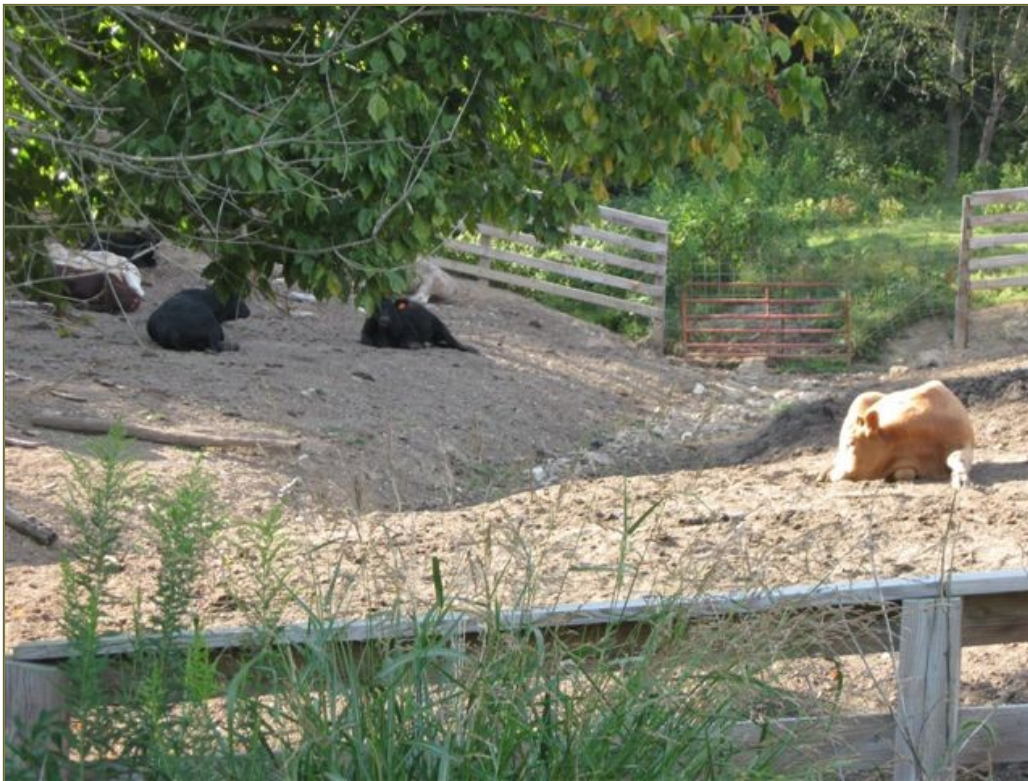




Joey Southern (un-named tributary to Mulberry Creek, project complete)

BMPS installed:

1 water well, 3,078' of pipeline, 3 watering facilities, 30' x 65' heavy use area protection, 2,374' of fence, 1 culverted stream crossing, 250' of farm access road. Funding Sources: TDA, USFWS, and EPA 319.



Areas such as this one continue to cause water quality problems in the watershed. In rain events these small streams, drainage ways and wet weather conveyances collect and funnel large amounts of sediment into Mulberry and Little Mulberry Creeks.

The goal is to target these sites, assist landowners in correcting these problems, and making more environmentally minded farming decisions in the future.

GRANTEE: Clinch-Powell Resource Conservation and Development Council
PROJECT NAME: Tennessee Grazing Lands Conservation
GRANT YEAR: FY2008
WEBSITE: <http://www.clinchpowell.net/>

Training has continued over the last twelve months with pasture condition scoring worksheets and up dates to the Graze program. The Grazing specialist has made several contributions to the Pasture Score Sheet update, the Fence Specifications Guide, and the Graze program. Along with training there have now been thirty three land owner visits, eleven contributions to NPS grazing sites, eleven voluntary grazing land BMP projects, and thirteen work shops.

Grazing Land Specialist co-hosted tour stop at the Hermitage for the National Association of Conservation Districts on cross fencing and alternative water sources. He also assisted with the production of the 2010 499 Cattle Company Field Day with sixty five producers in attendance. A booth was set up and literature dispensed for the Roane County Grazing Conference. Plans are made to attend and present at the Tennessee Forage and Grassland Council Meeting in November, as well as Tennessee Cattlemen's Association annual meeting.



David Johns farm on Lick Creek have been fenced out of the creek and watering points installed to improve water quality. Cost share funding provided by NRCS.



Cross fencing on David Johns farm to create a multi paddock system for rotational grazing and better use of forages. This project is complete and everything has been signed off on.



Charles Lehnart (Brushy Creek) cattle have access to creek over fifty percent of time. Plan to install alternative water source and heavy use area.



Construction of alternative water for Charles Lehnart to keep cattle out of creek. Project paid for with NRCS funding.

GRANTEE: First Tennessee Development District
 PROJECT NAME: Cash Hollow Creek Watershed Plan
 GRANT YEAR: FY2005
 WEBSITE: <http://www.ftdd.org/>

The Cash Hollow Watershed Base Plan has been developed by the First Tennessee Development District in consultation with many partners including the Boone Watershed Partnership (BWP) and the Tennessee Department of Environment and Conservation (TDEC). The Watershed Base Plan was submitted to the State of Tennessee Department of Agriculture in September 2010 for final approval.

During the past year, the First Tennessee Development District (FTDD) met with personnel from East Tennessee State University (ETSU), TDEC, Natural Resource Conservation Service (NRCS), and attended BWP meetings to collect data and information for the compilation of the Watershed Base Plan. FTDD hosted a public meeting for the residents of Cash Hollow Creek to offer information about services to

help the community clean-up efforts. The public meeting proved to be a success with several of the Cash Hollow Creek residents willing to help with future efforts to clean the creek and community. The following photographs highlight the water quality issues surrounding the efforts to rehabilitate Cash Hollow Watershed and the possible obstacles during implementation of the Watershed Base Plan.



Above: Intersection of Knob Creek Dry Dock Road and Austin Springs Road. Higher Ground Holiness Church



Above: Debris pile from construction located across Cash Hollow Road from Miller Hill Road.



Left: Debris pile next to creek located across Cash Hollow Creek Road from Mosier Road.

Photograph also shows 'No Trespassing' signage posted by the property owner.



Same property as photograph to the left. View shows an ATV trail located near Cash Hollow Creek.

GRANTEE: Giles County Soil Conservation District

PROJECT NAME: Robertson Fork Creek

GRANT YEAR: FY2009

Website: <http://www.gcscd.com/>

In Fiscal Year 2010 the Giles County Soil Conservation District was awarded a 319 Grant for the Robertson Fork Creek Watershed in the amount of \$284,000.00. These funds are being used to assist landowners in Northern Giles County with Best Management Practices (BMPs). Practices that are approved by the Giles County Soil Conservation District Board include filter strips, field borders, forested riparian buffers, fencing, pipeline, watering facilities, heavy use area, stream crossing, spring development, clearing and snagging, and waste storage facilities. Each of these practices is cost-shared at 75% with the exception of clearing and snagging cost-shared at 80%. All practices are to be installed according to the guidelines used by the Natural Resource Conservation Service. Upon completion Tanner Barksdale, Watershed Coordinator and Rusty Walker, NRCS District Conservationist will inspect the practice before submitting for the client's reimbursement.

Since its beginning more than 20,000 feet of access control and cross-fencing has been installed and another 20,000 feet is committed on signed contracts. Ten clients have signed contracts to install practices such as Watering facilities, pipelines, spring development, heavy use areas, native grasses, and riparian forest buffer. In March the district sent out letters to 165 clients in the Robertson Fork Creek Watershed informing them of the availability of the grant. This letter was the biggest introduction yet to the soil districts' 319 grant, and has reached more than 90% of the clients that have shown interest and signed contracts. The district also attracted attention with their display at the Giles County Fair held in August. The display highlighted the information that was announced in the March 319 RFC Watershed Letter and the many benefits of managed grazing. Last but not least Giles County has also had the privilege of extending grant funds to Marshall County landowners bordering Giles County with property in the Robertson Fork Creek Watershed. The district's goal is to have this five year contract completed in two years. With the success of this grant the district also plans to apply for additional grants in the near future that will cover other Watersheds in Giles County.



Kevin Walker Project—Livestock Access Control on stream with 4,980 feet of fencing



Gary Burgess Project -Pipeline Dig Project included approximately 1185 feet of pipeline



Don MacDermid Project—Cross-fence which included 1018 feet of fencing



John Worthman Project— Frost Proof 4 Ball Waterer District employee Chip Rose waiting on the GPS to pick up signal!

GRANTEE: Greene County Soil Conservation District
PROJECT NAME: College Creek Restoration
GRANT YEAR: FY2009

Website: http://www.greenecountyngovt.com/s_soilconservation.php

During the third contract year on College Creek activities related to reducing runoff resulting from large areas of impervious surface has been reduced as concentration has been geared towards smaller scale projects. The emphasis during the period has been on farm BMPs and design of small scale bio-retention cells. The Designs for the Meadows pond has been completed but construction has been delayed as work continues on easements and maintenance agreements that satisfy the town and the land owners. This Project is complicated by multiple land owners being involved in the process. It is anticipated that the Meadows pond will be completed by spring 2011. Additional stormwater studies have been conducted for Viking View (a condominium village), The Meadows Townhome Village and Tusculum College. Stormwater Management these locations will be completed this contract period.

Six BMP installations have been completed during the current year.

1. Streambank repairs, including some areas of rip-rap, along 5 contiguous were completed. In addition to the rip-rap areas bank shaping and vegetation was included in all areas –

Streambank Repair along College Creek.



2. Trees were planted in several areas along the creek including about ½ mile of creek on the Tusculum campus. This effort was accomplished through donation of trees from the Tennessee Environmental Counsel and volunteer labor from the Middle Nolichucky Watershed Alliance. This photo shows the planting mainly of small trees. –

Note: Plans have been completed for more streambank stabilization and exclusion fencing on 3 farms in the lower areas of the creek.



Trees for streambank restoration along 3 of the 5 lots worked on the creek.

3. The most recent BMP completed was a rain garden on the campus of Tusculum College completed in mid September by students from the college and heavy excavating by a local contractor. The bio-retention was located at one of the student houses that provide campus lodging. Tusculum College students participated in this activity as part of a community service day.



Students working on Rain Garden on Tusculum Campus that reduced runoff from roof downspout.

Rain Garden near Completion.

The wetland planned on the Tusculum Campus has been approved by the College Board of Trustees. Rain harvesting at Tusculum College plans continue to be considered.

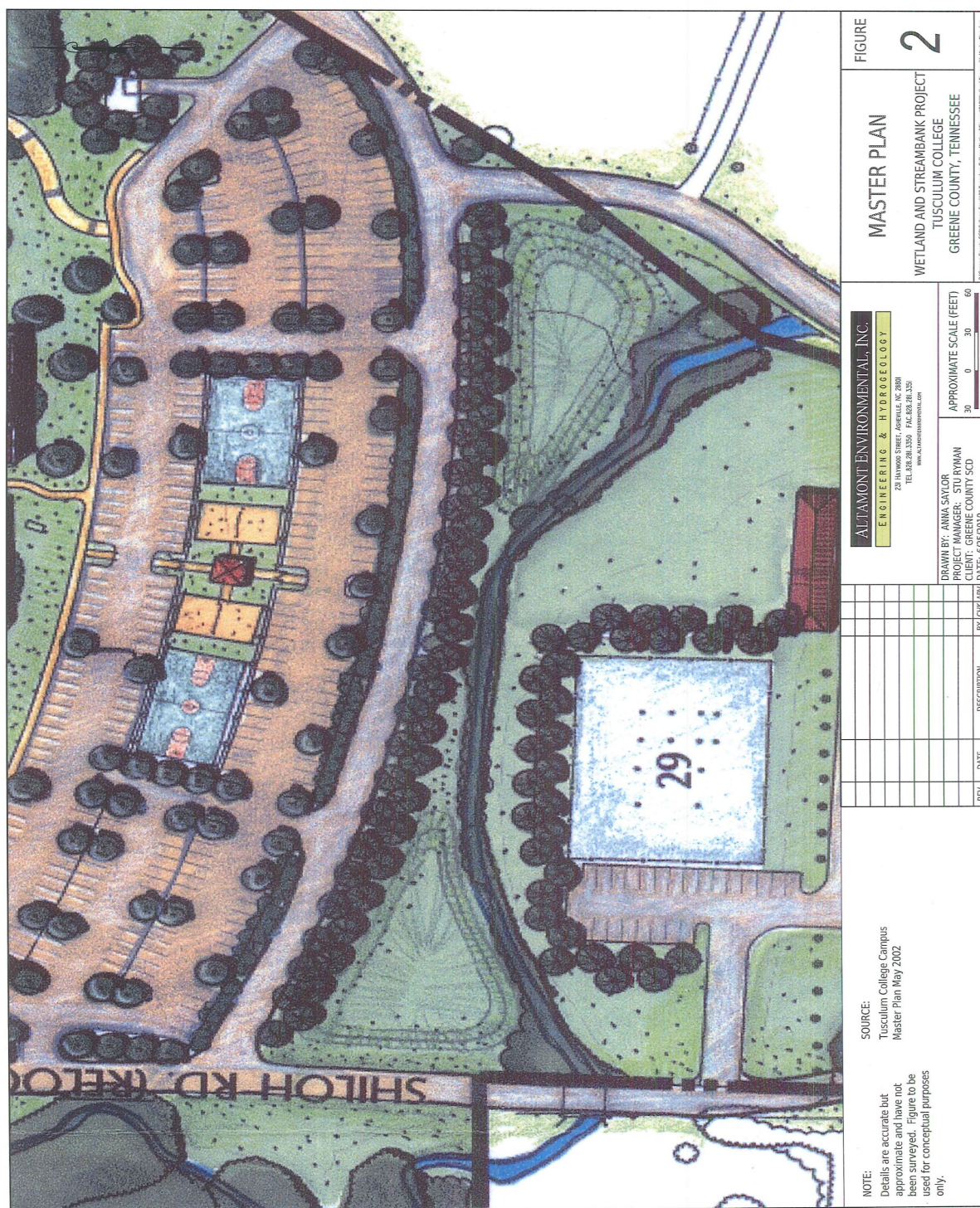


Also two educational activities have been conducted during the current year.

1. On May 13, 2010 a "Kids in the Creek" was conducted in cooperation with TVA and the Middle Nolichucky Watershed Alliance for 8th graders from the Greene County schools. No 319 funds were used for this activity.

2. A team of Environmental Studies students from Tusculum College have continued to conduct bi-monthly water sampling at 8 stations along College Creek in an effort to monitor progress toward elimination of stream impairments. The 8 stations are at road crossings along the creek and the students have been measuring siltation and performing chemical analysis for detergents and other contaminants. During the last year 6 sample sets have been collected. After completion of the Ingles pond and the Streambank work along the creek, the levels of suspended solids have decreased after storms in the upstream monitoring sites. Also with the repair of a sewer leak discovered by the students and the elimination of gray water discharges the levels of detergent have dropped to near zero.

Master Plan for Wetland and Streambank Stabilization for College Creek



GRANTEE: Harpeth River Watershed Association
PROJECT NAME: Headwaters Implementation
GRANT YEAR: FY2005
WEBSITE: <http://www.harpethriver.org/>



In 2009-10, the Harpeth River Watershed Association (HRWA) has made substantial progress in initiating the "Harpeth River Headwaters Water Quality Improvement Program" in association with the Harpeth River Headwaters Restoration Plan Implementation – Phase I. This work is all focused on headwaters streams in Eagleville, TN (Rutherford County), the foundation for which was laid with a series of previous community meetings and bacterial studies by Harpeth River Watershed Association under a 319 grant that concluded in 2008. To introduce the program offerings, technical assistance and restoration fund availability, and to get community feedback and buy-in, HRWA hosted an advisory committee and a community meeting in November 2007. These meetings were very significant in both providing a platform for disseminating information about proposed work in the area and recruiting landowners with restoration needs, but also in eliciting feedback about the plan of approach for working in the community and identification of priority locations. Additionally, HRWA had a booth at the Eagleville CO-OP Customer Appreciation Day, where information was provided on the program and names were taken of interested landowners.

HRWA has worked with a core group of landowners, all of which are cattle and dairy farmers, to implement a variety of best management practices to improve water quality by focusing on agricultural and nutrient management and soil conservation/erosion control, as well as addressing existing degraded stream conditions. In the last report, HRWA detailed several projects for cattle exclusion, enhanced stream buffers and alternative watering sources such as ball waterers. The final piece of this Phase 1 Implementation of the Headwaters Restoration Plan was to provide a limited access watering area on one parcel and an alternative water source on another parcel of farm that had been using an in line pond for watering. The pond had severe erosion and siltation problems due to cattle walking in the pond, and HRWA had helped provide cattle exclusion fencing for this pond, but the gates could not be closed until an alternative watering source could be provided. An existing pump house and well on an adjacent lot with a residential trailer was utilized and HRWA provided a pump and ball waterer, while the farmer installed the water line to supply water to the waterer about 100' from the well house, and also buried an electrical cable between the existing electric meter and the well house where the pump was installed. These projects demonstrate the use of site specific solutions to achieve the same goal of keeping the cattle from causing severe erosion and increasing contaminants such as *E. coli* and other fecal coliforms.



Limited access area on Hobbs Farm using Hoof Grid® product to prevent erosion and movement of gravel (left), and a buffer zone along the Harpeth River (right).



The new pump in the existing well house (left) and the ball waterer (right) in the pasture adjacent to the property with the well house. Note the closed gates in the back ground.

GRANTEE: Harpeth River Watershed Association
PROJECT NAME: Jones Creek Implementation
GRANT YEAR: FY2005
WEBSITE: <http://www.harpethriver.org/>



In 2009 and 2010, the Harpeth River Watershed Association (HRWA) continued to work in Dickson County on projects to improve the water quality of Jones Creek. As part of this effort, HRWA formed a Dickson County Water Quality Advisory Committee to help with the identification and prioritization of restoration projects. During the course of the year, key members of this committee have accompanied HRWA staff on field visits to select sites and provided valuable technical assistance. With input from NRCS District Conservationist Wynn Mitchell and UT Extension contacts, as well as the MS4 consultant for Dickson, it was decided that there are adequate agricultural best management practices underway and that due to the extreme need, HRWA's restoration focus should be mainly on stormwater management. Three priority projects were selected, including installation of a large rain garden and a bank stabilization project at the USDA/NRCS Service Center/Food Lion Shopping Center to capture stormwater runoff from the parking lot, a rain garden project at the Dickson City Hall, and providing technical and financial assistance toward aspects of stormwater management at Creek Wood High School, one of the main contributors of stormwater and sediment to impaired Jones Creek. This included input into the development of a stormwater management plan and funding of specific on-the-ground projects. Due to the size and scope of this project (with large volumes of water leaving the site), there was substantial work done to implement the Creek Wood stormwater management plan in order to improve the water quality of Jones Creek.

Harpeth River WS Association—Jones Creek continued....

The rain gardens and bank stabilization were completed and functioning according to plan by the fall of 2009. HRWA, with the advice and direction of the Dickson County Water Quality Advisory Committee, had determined the erosion issues at Creek Wood to be a major contributor to sediment pollutant loads in Jones Creek, and placed a high priority on correcting this problem. The project at Creek Wood required a grading contractor for the first phase, and after Dickson County Board of Education put the project out for bid, and settled on a contractor, the cost was set at \$29,400. HRWA estimates that well more than \$100,000 will be needed to completely address the problems at Creek Wood, and to encourage the first phase of this work, it was decided that HRWA would direct 319 funds in the amount of \$10,000 toward this project. The School Board was encouraged to seek 319 funds directly for subsequent phases, which they did. This first phase was completed in December of 2009, and funds were forwarded to the Dickson County School Board to apply toward the total cost of this first phase. This work completes HRWA's phase I implementation plan for the restoration of Jones Creek.



Left & Right: Construction of a rain garden and bank stabilization project to mitigate storm-water runoff from the parking lot at the Dickson USDA/ NRCS Service Center.



Left & Right photos: Construction of a rain garden at Dickson City Hall that serves as a demonstration project for developers, contractors and citizens in Dickson County and City.



Left: Erosion at Creek Wood High School around a water line and stormwater outfall that drains to Jones



Above: The detention pond that is phase one of a larger project to address all of the erosion problems there affecting Jones Creek.

GRANTEE: Ijams Nature Center
 PROJECT NAME: Stock Creek Watershed Restoration Plan
 GRANT YEAR: FY2005
 WEBSITE: <http://www.ijams.org/>



Since October of 2009, the Stock Creek Task Force (SCTF) under the auspices of the Water Quality Forum partners has continued to educate the community on and involve them in addressing water quality issues. Planning and implementation of these projects are conducted by two SCTF Committees that meet monthly, one focused on education/outreach and the other on monitoring and on-the-ground projects. Part 1.0 of this report addresses SCTF educational efforts that involve students, the agricultural community and the Stock Creek residents-at-large. Part 2.0 describes data collection efforts, preliminary plans for a stream restoration project and a currently completed Ag BMP application.



SCTF Education/Outreach Initiatives

2009/10 Adopt-A-Watershed (AAW) Program

Adopt-A-Watershed is a curriculum-based service-learning program conducted in fifteen Knox County schools including South Doyle High located in the Stock Creek Watershed. As a part of the 2009/10 program, the Ecology classes conducted investigations of the watershed involving land use impact analyses and biological, physical, and chemical stream monitoring. The fall class then used this information as the basis for a project intended to educate the public on nonpoint source (NPS) issues. The spring class used this foundational knowledge to educate the community about stream restoration.

The fall Ecology class created side panels to the SCTF display that focused on two primary water quality issues, sediment and bacteria. Specifically, they addressed sources, impact, and mitigation approaches. Figure 1 shows the final design for the pathogens panel. This is a synthesis of student group products that was integrated by a CAC AmeriCorps Water Quality Team Member and a WRRC Graphic designer.

The spring Ecology class studied the *Tennessee Stream Mitigation Project* that was conducted on a Stock Creek tributary flowing through the John Sevier Home site (i.e., Marble Springs). The students visited the site and learned about its details from a TSMP staff member. Student groups then developed mock-up kiosk displays describing the components of this project including defining terminology, showing applied techniques and explaining its benefits. The Marble Springs staff has the "winning" student group mock-up that will be used as a template for a kiosk that will be installed adjacent to the TSMP site. It is anticipated that the kiosk will be installed in the spring of 2011. The Marble Spring staff is creating walking trails through the property and is going to place the kiosk adjacent to it.

They have also worked with the TSMP staff for an easement exemption so that the kiosk can be located in the immediate vicinity of the project.



Stock Creek Farmer's Breakfast

The Stock Creek Farmer's breakfast was initiated in 2007 to create an "ag-network" within the watershed by providing a venue for farmers to build relationships with one another as well as with SCTF partners. It is also to educate farmers on a range of agricultural BMPs including how to seek technical and financial assistance for their implementation. SCTF is now conducting them on an ad hoc basis. This past year, a breakfast was held on January 23, 2010. UT Professor, Dr. John Buchanan, spoke about septic system maintenance and

wastewater solutions.

Stock Creek Community Focus Group

On March 30th, the SCTF Education Committee convened a community focus group at Marble Springs (i.e., John Sevier historic home site) office to obtain community feedback on the current education/outreach efforts. The meeting was by invitation, with attendees including neighborhood association representatives, teachers, farmers, select Marble Springs' staff and its Board members, and citizens active in the community. In total, twelve participated. The structure for the meeting was as follows:

Obtain ideas for involving Stock Creek residents in current SCTF initiatives
Identify watershed issues Stock Creek residents felt were pressing; and
Determine ways the SCTF can better reach its target audiences and influence behavior changes

Among key outcomes was the building of a significantly stronger relationship with key community members including those from a long-standing and influential homeowner association (i.e., South Doyle Homeowner Association). The SCTF Ed/Outreach Committee meetings are also now held at Marble Springs to encourage community participation.

John Sevier Days

On September 25th and 26th the SCTF participated in "John Sevier Days," a two-day cultural festival involving local artisans and highlighting 18th century culture. With about 700 in attendance this year, I this event continued to be a prime opportunity for the SCTF Ed Committee to reach out to the community-at-large. On September 25th, two tents were staged, one featuring SCTF programs and projects and the other involving children's water quality educational games. In addition, the children investigated biological, physical and chemical features of the on-site creek.



*Above: John Sevier Days
SCTF Informational Tent*



*Above: John Sevier Days
SCTF Children's Activities Tent*



These photos show children exploring the creek at John Sevier Days.

On September 26th, a farm tour was coordinated on a farm located adjacent to the John Sevier Days festival. The farm is owned by Dr. DJ Krahwinkel who has installed the following BMPs:

1 watering facility and a 25 foot x 25 foot heavy use area protection pad;
900 feet of pipeline;
4,175 feet of exclusion fencing; and
1 spring development.

Participants were taken from the John Sevier festival to the farm on a tractor-drawn hay trailer, with presentations done by Knox County SCD staff and Dr. Krahwinkel, a UT professor at the School of Veterinary Medicine.



Photographs of the Stock Creek Task Force Farm Tour at Dr. DJ Krahwinkel's Farm

11 Stock Creek watershed signs were installed along the boundary of the basin along prominent thoroughfares as a way to increase public's awareness of the watershed concept and more specifically to direct their attention to the location of the Stock Creek basin.

Knox Chapman Utility District (KCUD) is extending their sewer lines and pump stations through areas with high rates of failing septic systems. A windshield survey was conducted in March along the sewer extension route. A number of failing septic systems were identified. In an effort to educate citizens about the opportunity to connect to the sewer lines, the SCTF and KCUD sent out a joint letter to homeowners.

It has also worked with KCUD to ensure the utility provides information to residents on Knox County cost share opportunities for septic hook-up for those on limited incomes.

Stock Creek Task Force Technical Initiatives

The SCTF Technical Committee focuses on collecting and interpreting watershed data (e.g., hydrogeomorphic changes; water quality) and subsequently identifying potential remediation projects.

Sampling

Knox County, TVA and Knox Chapman Utility partnered to conduct monthly sampling at selected sites. Samples were processed at Knox Chapman's lab and flow duration curves for pollutants are being developed by Knox County.

Stream Restoration

A project that is currently in the planning stages is located at mile marker 1.7 on Stock Creek and involves the potential remediation of 1,000 linear feet of stream bank. This stretch is located in a County-owned community park (i.e., French Memorial Park) at 7752 Martin Mill Pike. Efforts are being made to acquire an easement on the privately owned property on the opposite bank in order to conduct a more complete project. Alternative plans are being evaluated that include grading of the stream banks, improving in-stream habitat and installing grade control structures. Partial funding has been acquired through a local RC&D and TVA.

Agricultural BMP Applications

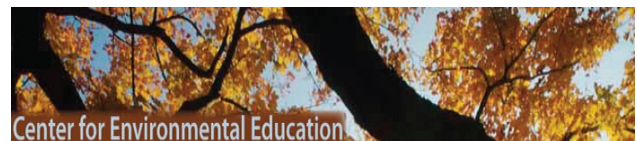
One additional agricultural project was completed in the Stock Creek Watershed in 2010. The Nick Lopez farm installed a watering facility, 100 feet of pipeline, a 24' X 24' HUAP, and 500 feet of cross fencing using a combination of TVA and ARCF cost share money.

GRANTEE: Middle Tennessee State University (MTSU)

PROJECT NAME: Discover the Waters of Tennessee

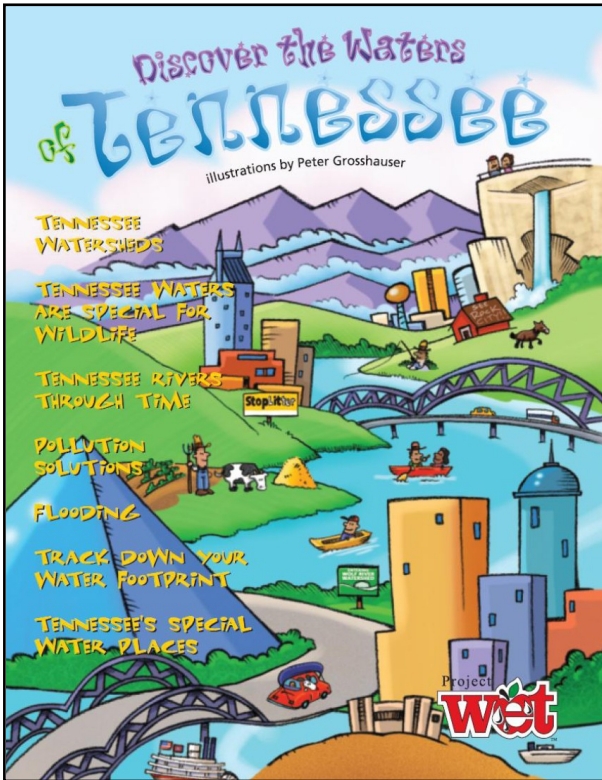
GRANT YEAR: FY2007

WEBSITE: <http://www.mtsu.edu/mtsucee/>

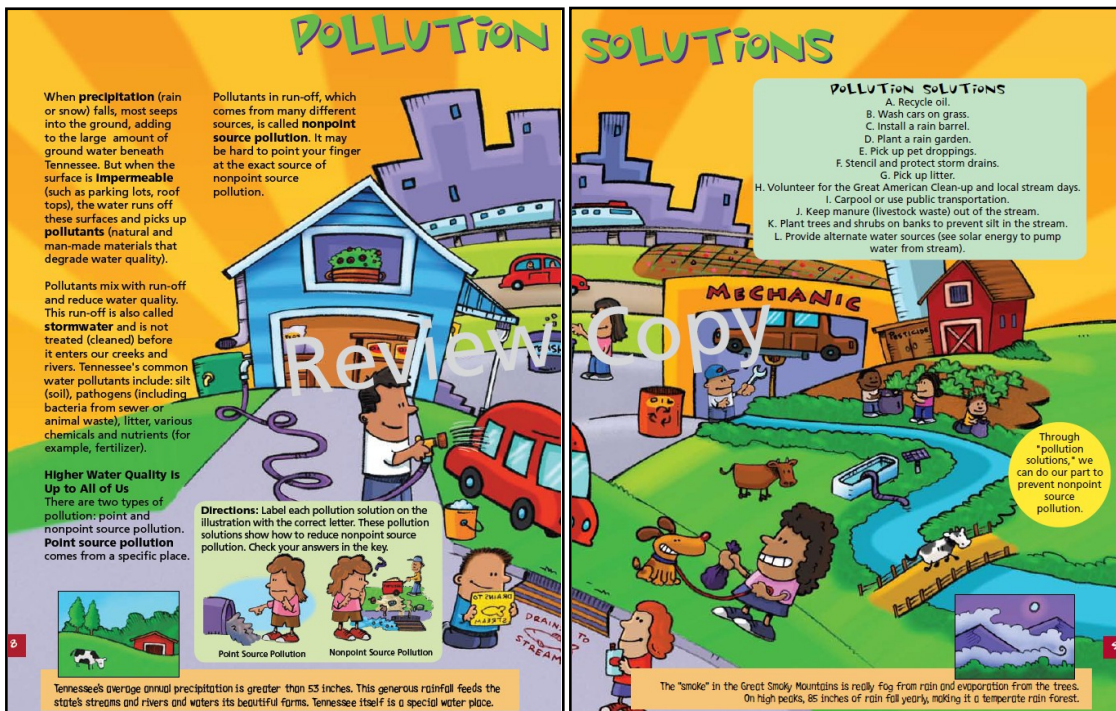


The project assembled a Leadership Team from experts across Tennessee to develop '*Discover the Waters of Tennessee*', a 16 page, full-color youth education booklet focused on water issues and protecting Tennessee water quality. The booklet is to be included among the copyrighted Project WET, Kids In Discovery (KIDS) series. KIDS booklets are written and fully illustrated for eight to 12 year olds. Each booklet spread includes creative investigations, and learning models, written to engage youth on many water topics. These informative, inexpensive booklets are excellent complements to school curricula or stand alone as a fun introduction to natural resource knowledge. Correlation of the book to Tennessee education standards is being done to generate teacher support of classroom class use.

The Leadership Team meeting was held in February 2010 to prioritize topics and to create a draft outline of the booklet. Throughout the year, the booklet was publicized to watershed groups (including 2 watershed conferences) ; to teacher communities (including 2 teacher conferences); and to statewide city and county governments through the TN Stormwater Association (including 2 environmental conferences). Initial printing of 75,000 booklets was anticipated. Publicity and sponsorship increased this to the final print in late August 2010 of 95,089 booklets for statewide distribution. Distribution has begun and will continue over the next few months. Booklets were distributed to Department of Agriculture in September 2010. The Center for Environmental Education at MTSU is about to complete and publish an online website page. The web site will describe the booklet, include a certificate for download, and provide additional education and water resource information. Included will be links to special water places throughout Tennessee to evoke a sense of stewardship for better protection of our state's unique water features.



Cover for the *Discover the Waters of Tennessee* booklet, printed Aug 2010. 95,089 booklets were printed.



Example of the page 8 and 9 spread *Pollution Solutions'* discussing nonpoint source pollution and water protection strategies.

ANSWER KEY

1. TENNESSEE WATERSHEDS, P. 2-5

- Mississippi
- Cumberland River Basin
 - Old Hickory Reservoir
 - Caney Fork River
 - Stones River
 - Harpeth River
 - Cumberland River
 - Bartley Reservoir
 - Dale Hollow Reservoir
 - Percy Priest Reservoir
 - Center Hill Reservoir
 - Collins River
- Mississippi River Basin
 - Obion River
 - Hatchie River
 - Loosahatchie River
 - Wolf River
 - Reelfoot Lake
 - Mississippi River
 - Forkeed Deer Rivers
- Upper Tennessee River Basin
 - Clinch River
 - Holston River
 - Tellico Reservoir

2. POLLUTION SOLUTIONS, P. 8-9



FLOODING, P. 10-11

- Severe flooding
- The water crested and receded quickly.
- Major Flood Stage was reached and exceeded at these stations.
- Both the Harpeth River and Mill Creek contributed to record river levels on the Cumberland.
- The Cumberland River exceeded the Major Flood Stage even though flood control measures have been in place for 73 years.

3. TENNESSEE'S SPECIAL WATER PLACES, P. 14-15

Reelfoot Lake, cypress trees: pg 14
Bridge, Mississippi River, Memphis: pg 2
Farm: pg 8
City scene, Nashville: pg. 10
Kayaker: pg 13
Great Smoky Mts.: pg 9
Conasauga River, people snorkeling: pg 5
Norris Dam, East Tennessee: pg 10
Water Mill: pg 7

What You, Your Family and Friends Can Do

- 55 (watersheds), Mississippi
- See page 4-5
- True
- No
- Habitat for fish and other wildlife, Recreation, irrigation of crops, Water for livestock and wildlife, Drinking water, Transportation plus Hydropower, industry and manufacturing of products.

YOU!

DISCOVER THE WATERS OF TENNESSEE BROUGHT TO YOU BY:











Educators: Please see the following educational resources and links that support this Kids in Discovery publication, *Discover the Waters of Tennessee*.
www.tennesseewaterworks.com
<http://www.apss.edu/wet/>
www.projectwet.org

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Scott Bean, Writer: Peter Grosshauser, Illustrator; Designed by Thomas Adkins, Adkins Design; Edited by Michael Sette

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TN Leadership Team: TN Project WET-Michelle Rogers, Kathy DeWain; TVA-Linda Harris, Laura Smith; TN Forestry-Dave Walters; TN State Parks-Jane Polansky; TWRA-Frank Pies, Patricia Miller, James Atkins; TDEC-David Duhl, Elaine Foust, David Orently, David Winters; Tennessee Aquarium-George Bartnik, Thaddeus Taylor; Keep TN Beautiful-Edmond McDavis III.

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Dennis L. Nelson, President and CEO
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Back page of the *Discover the Waters of Tennessee* booklet. Includes Leadership and Review Team information, and community sponsors, as well as answers to the activities on the related page spreads.



AWARDED TO

For completion of the "Discover the Waters of Tennessee" booklet

TEACHER/LEADER

DATE

Every act that contributes to local water quality has an impact on the quality of water statewide.
Thank you for contributing to the pollution solution!!
www.tennesseewaterworks.com

"Protecting our water...for life"

Website certificate for online download.

Teachers/ children can request upon completion of the booklet.

GRANTEE: Obed Watershed Community Association
PROJECT NAME: Crossville Headwaters Restoration
GRANT YEAR: FY2008
WEBSITE: <http://www.obedwatershed.org/>



**OWCA Mascot
The Spotfin Chub**



Obed Watershed Community Association

The Obed Watershed Community Association continued its work to improve water quality on three 303d watersheds during the period from October 1, 2009 through September 30, 2010. Seven projects were completed during this time period. The activities broke down into four types of activities. The first was a series of streambank restorations, beginning with the completion of the One Mile Creek project in December of 2009 (.6 miles protected, 1279 feet of bank stabilized), a section of the Obed River below the wastewater plant (700 feet protected, 200 feet stabilized), a section of Spiers Branch above the confluence with the Obed River (931 feet protected, 380 feet stabilized), and a second section of the Obed River above the confluence with Spiers Branch (2248 feet protected, 415 feet stabilized). The second activity was planting native woody species into and on top of the banks where bank stabilization activities had occurred during 2009. A total of 1817 feet of bank was planted with an additional 750 feet of plants were planted on top of the bank in two rows. The planting was done on nine sites. The third activity was the restoration of a washed out road crossing where the banks were actively eroding and forming a new channel. The road crossing was rebuilt with an additional high water culvert and the site stabilized. The final activity was the planting of a bare bank and the establishment of a riparian buffer along an intermittent stream at an elementary school. The bank seeding covered about one-quarter acre and the riparian buffer ran 300 feet with ten feet on each side of the channel.

In addition to the hands on-activities, education of the community continued through OWCA's website, newsletter, fact sheets, booths at the County Fair, Home Show, and Garden Show, as well as presentations to various organizations and programs with three schools. OWCA continues to work closely with the Crossville stormwater program to coordinate activities and to plan for future activities. Much work was also done to scout potential future projects. It is expected that funds from this contract will be exhausted by spring of 2011.



Bank Restoration on One Mile Creek with Stone Toe



Same site on One Mile Creek after planting and natural revegetation eight months later. This area was completely inundated a number of times during that period.

Obed WCA continued...



Bank Restoration, Tree Protection, and upstream barb on the Obed River.



Before: Ditch full of sediment which carried down to Spiers Branch

After: Stabilized bank planted with native grasses at Martin Elementary School.





After: High School Landscaping Class planted this buffer along an intermittent stream which is normally mowed to the bank.

GRANTEE: Southeast Tennessee Resource Conservation & Development Council
PROJECT NAME: Conasauga River TMDL Implementation
GRANT YEAR: FY2009

Southeast Tennessee (SETN) RC&D Council was awarded a Section 319 Clean Water Act grant in February 2010, to begin the TMDL implementation phase of the Conasauga TMDL plan to reduce pathogens from failing septic systems and agricultural nonpoint sources in Ball Play, Mill, and Coahulla Creeks. Key elements of implementation include:

- (1) establishment of local technical advisory teams,
- (2) public awareness and support for project BMPs, and
- (3) GIS targeting for BMPs.

Technical advisory teams were established for agricultural activities with partners from USDA NRCS, Tennessee Department of Agriculture (TDA), Polk and Bradley Soil Conservation Districts (SCDs), and Conasauga River Alliance (CRA); and for septic systems with partners from Tennessee Division of Groundwater Protection (TDGP), Polk and Bradley SCDs, and CRA. As implementation progresses, additional advisory members will join. GIS databases used to target BMPs were finalized to include an aerial inventory of land cover and structures along a 300-foot buffer of blue-line streams in Mill, Ball Play, and Coahulla Creek watersheds.

Digital data files Mill, Ball Play, and Coahulla Creeks can be viewed by going to the following links:

Domestic and Agricultural Sites

<http://www.northrivergeographic.com/documents/Conasauga/BallPlay.pdf>

<http://www.northrivergeographic.com/documents/Conasauga/MillCreek.pdf>

<http://www.northrivergeographic.com/documents/Conasauga/NorthCoahulla.pdf>

More Digital data files Mill, Ball Play, and Coahulla Creeks can be viewed by going to the following links:

Riparian Cover

<http://www.northrivergeographic.com/documents/Conasauga/BallPlayRiparian.pdf>

<http://www.northrivergeographic.com/documents/Conasauga/MillCreekRiparian.pdf>

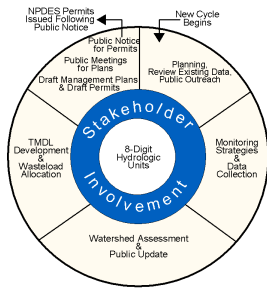
<http://www.northrivergeographic.com/documents/Conasauga/NorthCoahullaRiparian.pdf>

Public support and awareness of the Conasauga River project is enhanced by rain barrel workshops funded through a grant from the World Wildlife Fund Southern Rivers Program. The workshops provide a venue to talk about the Conasauga River 319 project, nonpoint source pollution, and conservation practices that reduce polluted runoff. Participants are told about the 319 grant to repair failing septic systems and address agricultural sources of pathogens to the river. A total of 8 workshops are planned for the Conasauga river watershed in Georgia and Tennessee: 6 in TN and 4 in Georgia. One barrel and hardware are provided to each participant who then installs the hardware during the workshops. Several local newspaper articles in Cleveland, Tennessee and Dalton, Georgia have covered the events.



Figure 2. Participants at second rain barrel workshop, Cleveland TN June 5, 2010

GRANTEE: Tennessee Department of Environment and Conservation – Water Pollution Control
 PROJECT NAME: Monitoring, Assessment, and TMDL Development Support
 GRANT YEAR: various/recurring
 WEBSITE: <http://www.state.tn.us/environment/wpc/>



In 1996, TDEC began a watershed initiative to manage water program activities for water quality improvement. The watershed approach consists of five parts: planning and data collection, monitoring, assessment and allocation, drafting watershed plans, and implementation of watershed plans. This project assists with the assessment of watersheds through the five-year rotational watershed approach. Incremental grant funds are also allocated to TDEC-WPC to support the statewide development of TMDLs. These projects are funded annually by

TDA-NPS.

GRANTEE: Tennessee Environmental Council
 PROJECT NAME: Rutherford Creek Restoration
 GRANT YEAR: FY2006
 WEBSITE: <http://www.tectn.org/>

The Tennessee Environmental Council's Duck River Opportunities Project (DROP) was initiated in 1999 by the Tennessee Scenic Rivers Association and has focused on the restoration of smaller 1st and 2nd order streams. The primary activities, as promoted in the 2007 Rutherford/McCutcheon Creek Watershed Restoration Plan that are being accomplished include restoration of creek banks and reforesting the riparian zones. In addition in late 2009, the Council and volunteers built the first rain garden in Harvey Park adjacent to McCutcheon Creek.

Volunteers watch as Beau Hearing, Spring Hill Codes Director digs a hole for one of the 622 trees planted in the last year.



TEC—Rutherford Creek Restoration continued....

From September 2009 through September 2010 the Council installed 622 trees, over 600 live stakes, and repaired approximately 1390 feet of the banks of Grassy Branch and McCutcheon Creek. The work was carried out with approximately 134 volunteers working a total of approximately 804 man hours, in the heat of summer and cold of winter. Fortunately, the flood of May 2010 destroyed only 60 feet of structural work (revetments), but did remove or destroy many live stakes and caused more bank failure.

In February, 2010 volunteers installed live stakes in sections of McCutcheon Creek and Grassy Branch. Live stakes were installed in most lengths of revetments placed earlier for bank stabilization. Unfortunately many live stakes were lost during the May 2010 flood.



Volunteers, assisted by Council Staff trimmed downed trees and removed debris following the May 2010 flood (right).



Volunteers and Council staff repaired damage to creek banks as a result of the flood (left).

TEC—Rutherford Creek Restoration continued....



Volunteers create jetties by moving rocks to help protect stream bank.



Cedar revetments are installed on a critical bend in the stream channel.

On Saturday June 19, 2010 the Tennessee Environmental Council's Executive Director John McFadden and Duck River Coordinator Kevin Burke worked with 9 volunteers to install approximately 150 feet of cedar revetments along the banks of Grassy Branch Creek. The creek has been altered from the flooding that occurred during the first weekend of the May 2010. Previous work had to be repaired and reinforced. Once that was done, work was moved to a new area downstream. The cedar revetments are made up of 2 or 3 small cedar trees wrapped in coir matting. The cedar revetments work to slow water velocity down thereby reducing erosion. The revetments also provide a structure for soil and debris to collect and promote vegetative growth along the stream bank. The roots of the newly established stream side shrubs help to filter the runoff entering the creek after rain events.



Executive Director John McFadden secures a revetment to the creek bank.



Everyone gathers for a group picture.

The work being done on Grassy Branch Creek is essential to providing clean water for the Duck River Watershed. Clean water is not only important for drinking but also promotes a healthy environment. Sightings of crayfish, minnows, bullfrog, and snakes were encouraging signs of a productive ecosystem. It has been documented that 40% to 60% of all non point source pollution in rivers and streams is caused by silt and sedimentation. The cedar revetments help to reduce these percentages. It is because of the generous funding from the GM Spring Hill plant, the Tennessee Department of Agriculture (non-point source pollution division), the TWRA, and the EPA that work is able to continue. The Wyngate Homeowner's Association and the City of Spring Hill's codes department also provide much needed support to see that these natural resources are restored and protected for future generations.

GRANTEE: Tennessee RC&D Council
PROJECT NAME: Tennessee Envirothon
GRANT YEAR: FY2009
WEBSITE: <http://www.tnrcd.org/>



The 2010 Tennessee Envirothon Program was an opportunity for 137 high school science clubs, 4-H, and FFA teams to compete in the interactive environmental contest, testing their natural resource management and ecology knowledge to become well versed stewards in the future. There were 653 students with 99 teachers working with 195 multiple level resource agency personnel and volunteers from across the state. There was an increase in the number of Envirothon participants, due to the earlier announcements of the local contests at the beginning of the school year. This outreach format will continue as many schools and teams are reached for future contests. There were 11 Regional contests hosted that served as the qualifiers for the state level competition. The five stations students competed in were: Soils and Land Use; Aquatic Ecology, Forestry, Wildlife and the Protection of Groundwater through Urban, Agricultural and Environmental Planning. The state contest was modeled after the North American Canon contest, and was held at Lipscomb University in Nashville, utilizing their campus facilities. Majority of the event was held indoors, with the preliminary study scenario provided around and off-campus.

The top winning team for the 2010 Tennessee Envirothon contests was Montgomery Bell Academy from Nashville Tennessee. The second place team was South Greene FFA from Newport; and the third place team was Clinton High School. The State Envirothon Committee was able to recognize the top scoring teams from the six subject stations with a bamboo plaque. Montgomery Bell Academy was afforded the chance to travel to California State University in Fresno, to compete with 50 states, U.S. territories, and Canadian provinces to the coveted prizes and awards for the top teams. Although Tennessee did not place in the top 20 teams this year, the team members and coaches agreed it was an experience of a lifetime.



A top team recognized for highest scores at the wildlife station and the presentation scenario.

Tennessee RC&D Envirothon continued....



Regional contest participants assessing the soil pit station.



A TDA-Forestry partner explained the tough questions.



Montgomery Bell Academy receives state honors at Lipscomb University-Nashville for being the highest scoring team overall. They moved on to North American Canon Envirothon at Fresno State University, California.

GRANTEE: Tennessee Valley Authority

PROJECT NAME: Tennessee Growth Readiness—Phase II

GRANT YEAR: FY2004

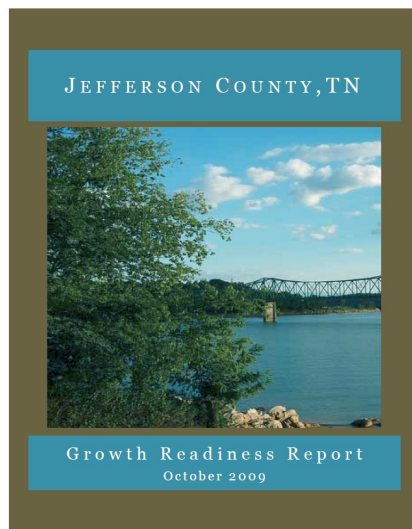
WEBSITE: <http://www.southeastwaterforum.org/training/growthreadiness.asp>

<http://www.tva.gov/river/watersupply/responsibilities.htm>

<http://www.tva.gov/river/neighbors/pdf/07-02.pdf>



The primary work under this contract was completed in prior years. During the last month of the contract period (10-1-09 - 10-31-09), TVA completed and made print-ready 2 project reports. They printed approximately 100 copies of each for use in the communities implementation efforts.



Above is the Jefferson County Growth Readiness Workshop Final Report with local recommendations and an action plan.

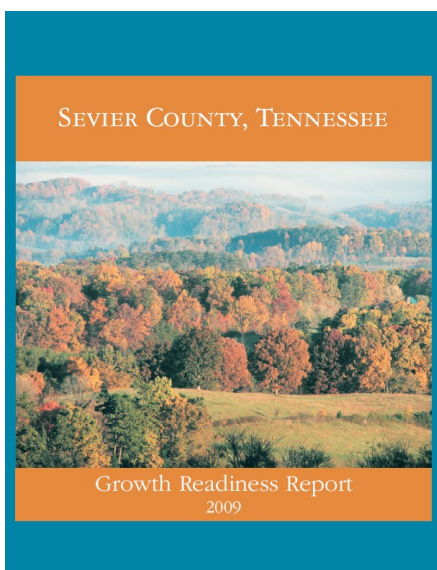
The consensus building process led Jefferson County and the municipalities of Dandridge, Jefferson City and Baneberry to recommendations toward 19 of the 22 Model Principles of Better Site Design, plus they added 3 new recommendations tailored to this region related to bike lanes, Agricultural Preservation and Green Infrastructure Planning.

Quote from Jefferson County Report:

"I would wholeheartedly recommend the Growth Readiness process to any community that is interested in taking a proactive role to determine the most advantageous balance of development and preservation of natural resources. It's the best series of workshops I've attended—and I've attended quite a few! The exercises we went through and the exposure we received to the Model Principles of Better Site Design were eye opening."

We were encouraged to anticipate where growth in our county is likely to occur, and to evaluate what kind of position we are in to be able to respond to it. We know these issues are coming; storm-water management is a prime example. The steps we take now are going to put us in a better position to handle the requirements we will be faced with in coming years. This economic downturn won't last forever. By dealing with these things before we are forced to, we actually have a chance to get ahead of the curve."

—Jim Hutchins, Dandridge Town Administrator



Left is the Sevier County Growth Readiness Workshop Final Report with local recommendations and an action plan. Sevier County Tennessee has the second highest projected growth rate in Tennessee (TACIR).

The consensus building process led Sevier County and the Municipalities of Gatlinburg, Pigeon Forge, and Sevierville to make recommendations toward 20 of the 22 Model Principles of Better Site Design such as street widths, parking lot run off and buffer zones. Also, they added two new recommendations tailored to this region related to visual/light pollution and "Firewise" Principles.

GRANTEE: The Nature Conservancy
PROJECT NAME: Big Rock Creek Project
GRANT YEAR: FY2006
WEBSITE: <http://www.nature.org/wherewework/northamerica/states/tennessee/>



The Big Rock Creek Project continues to make progress in both the urban and agriculture communities in Marshall County. Great strides were made with the City of Lewisburg on the management and care of the Big Rock Creek streambanks this year.

Work is also continuing on several farms in the watershed. Exclusion fence, heavy use areas, stream crossings, travel lanes for livestock and alternative water sites have been installed on several farms. Trees were also planted on several farms to help establish riparian zones on Thomas Branch, Big Rock Creek, East Rock Creek and New Lake Reservoir.

More projects are being planned with the City of Lewisburg, Marshall County Solid Waste Department, NRCS and Marshall County annual stream cleanup.



Exclusion Fence at Big Rock Creek



Sinkhole Protection at Big Rock Creek



Alternative Waterer and Heavy Use Area at Big Rock Creek

GRANTEE: Union County Soil Conservation District
PROJECT NAME: Hinds Creek Watershed Restoration
GRANT YEAR: FY2008

This is the annual report for work completed in the Hinds Creek Watershed in both Anderson and Union Counties from October 1, 2009 through September 15, 2010. During this period there have been a total of eleven projects completed, five in Union County and six in Anderson County.

The completed projects include the following Best Management Practices: 43 acres of pasture renovation, 3,000 feet of exclusion fence, 5,940 feet of cross fence, and eight heavy use areas and watering systems.



Of the BMP's that have been worked on, the total completed percentages toward contract fulfillment is: 11% pasture renovation, 19% exclusion fence, 30% cross fence, and 32% HUAP's and watering systems.

Cross Fencing at Eddie Turpin Farm.

Watering Facility at Eddie Turpin Farm in Anderson County.

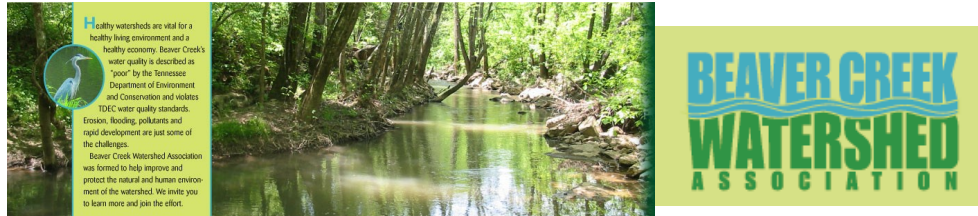


GRANTEE: University of Tennessee

PROJECT NAME: Beaver Creek Watershed Restoration Initiative

GRANT YEAR: FY2007

WEBSITE: http://www.knoxcounty.org/stormwater/pdfs/beaver_creek_overview.pdf
<http://www.beavercreekwatershed.org/projects3.php>



Installation of Agriculture BMPs have significantly increased in 2010. Knox County Soil Conservation District (SCD) staff have completed conservation plans for 12 landowners in the Beaver Creek watershed and six of those landowners implemented all or part of their conservation plans in 2010. BMPs installed under those conservation plans included: 535 feet of cross fencing on the Charles Tompkins farm; two 3,600 square feet of HUAP and a 233 feet of access road on the Scobie Branson farm; an alternative watering facility with 450 feet of pipeline, 660 feet of access control fencing and 4,515 feet of cross fencing on the Proctor Hensley farm. Four additional landowners were working on implementation of their conservation plans at the end of the 2010 reporting period.

Design work for the Brickey Elementary School was completed in the first quarter of 2010 along with design of 3 rain gardens for Powell Station Park and Powel Middle School. Construction of Phase I of the Brickey Outdoor Classroom stormwater wetlands was completed in the 3rd quarter of 2010. Three rain gardens were installed in the 3rd quarter of 2010, one at Powell Station Park (900 sq. ft) and two at Powell Middle School (150 sq. ft. and 1,100 sq. ft.). Another Low Impact Development (LID) project was completed in Gibbs High School in the 2nd quarter of 2010. Mr. Baham's construction trade classes with technical support from staff of Living Roofs, Inc, Ashville, NC designed and constructed a 16 X 20 foot utility shed with a Green Roof. The shed was installed at the Gibbs High School Outdoor Classroom. A concept plan for the Harrell Road Conservation and Stormwater Demonstration Park was completed and approved by the Conservation Committee of the Legacy Parks Foundation. A wetland delineation was completed for the site. In addition, native species were tagged and the site bush hogged in preparation for a survey. The site survey for the Park was completed in the 3rd quarter and the BCTF and LPF are in the process of selecting a contractor for a design/build of Phase I which will include a stormwater wetlands and a pervious paver parking lot.

Six Tennessee Yards and Neighborhoods Program (TYN) Introduction workshops (6 hours each) and one "Make It Take It" Rain Barrel workshop (2 hours) have been conducted through the fourth quarter of 2010 with support from the Beaver Creek Watershed Association. In addition BMP brochure to inform land owners on BMP funding opportunities and technical assistance provided by Knox County SCD was completed and distributed in 2010. The Beaver Creek Education Committee has decided to move the Farmer Breakfast along with a Farm tour event to first half of 2011. The tour will highlight the many landowners have implemented conservation plans on their farms in 2010 and will be conducted on March 26, 2011.

GRANTEE: University of Tennessee
PROJECT NAME: Tennessee Yards and Neighborhoods Program
GRANT YEAR: FY2008
WEBSITE: <http://tnyardsandneighborhoods.tennessee.edu/Pages/default.aspx>



Over the course of the past year, 7 Tennessee Yards and Neighborhoods Program (TYN) *Homeowner Landscape Workshops* have been conducted with a total of 88 attendees. TYN Coordinators feedback has included that attendees have responded positively to the workshops, asking questions and letting the trainers know how much they value the information provided. No negative verbal feedback has been reported. Post workshop evaluations have collected demographic data on all participants to date, showing the majority of attendees are currently retired and female. The primary ongoing challenge articulated by local TYN Coordinators is obtaining the desired participation. This has been attributed to several factors including:

- 1) the length of the workshop that excludes households with competing demands;
- 2) the current marketing materials that are not playing out to be as effective as hoped; and
- 3) the “newness” of the program. These challenges are now being analyzed by the TYN Management Team and the new TYN statewide

Advisory Board to develop strategies to address them. The Knox County TYN Program has continued to conduct the TYN Rain Barrel Workshops, partnering this past summer with the Ft. Loudon Lake Association (FLLA) to conduct a TYN “*Take it, Make It*” Workshop. In total, 15 attended the workshop and 24 barrels were sold.



*TYN Hamilton Co. Homeowner Landscape Workshop
(Trainer presenting is Master Gardener, Mike Payne.)*



*TYN “Make it, Take it” Workshop
conducted in conjunction with the Ft. Loudon
Lake Association.*

It is anticipated that the Tennessee Master Gardeners will make significant contributions to the implementation of TYN as it expands geographically as well as programmatically.

Roles will include:

- Assisting with workshop delivery (e.g., logistics, marketing)
- Conducting TYN Home Certifications
- Serving as TYN Advocates
- Creating Model TYN Yards

As a way to introduce Master Gardeners to TYN, a workshop was conducted as a component of the 2010 Master Gardener Winter School on February 17th. Forty-one Master Gardeners participated in the workshop that included an overview of TYN by Ruth Anne Hanahan and Stuart Bartholomaus (TYN Board Member) and an introduction to NPS issues by Robbie Karesh (TYN Board Member).

An important component of this workshop was a three hour working session to begin the development of a *TYN Yard Advisor Manual*. This is a handbook that will be used by Master Gardeners to conduct home evaluations of yards to determine if homeowners have met the *Tennessee Yard Done Right* criteria. It will be modeled after the Florida Yards & Neighborhoods (FYN) Home Certification Program.



*2010 Master Gardener Winter School –
TYN Workshop, Introduction by Ruth Anne Hanahan*

In order to more effectively manage and expand TYN, its Management Team determined the need to form a state wide advisory board. Factors that were taken into account in inviting individuals to serve on this board included developing a board composition with a diverse set of professional perspectives from the private, government and nongovernmental sectors including nonprofits and trade organizations. Following are the current TYN Advisory Board members and the organization that they represent.

1. Tennessee Master Gardeners – Stuart Bartholomaus
2. TDEC – Robby Karesh
3. US EPA, Region 4 – Connie Alexander
4. UT – Curtis Stewart, Landscape Architecture
5. TN Stormwater Association – Michael Hunt, Nashville
6. Private sector – John Watson, Common Grounds Landscape
7. Statewide Irrigation Association - Sherman Hendrickson
8. Watershed NGO representative – Doug Hausken
9. TN Utility Association – Vickie Houston*

UT—Tennessee Yards & Neighborhoods Program—continued....

The TYN Board has met a total of three times, with the first meeting taking place in Nashville on March 3rd and the following two taking the form of conference calls on June 11th and September 17th. The initial focus of the AB has been to address the following four issues:

- Strategies for maintaining high levels of participation
- Approaches to geographically expanding TYN
- Developing a sustainable source of funding
- Diversifying TYN's products and services

Each meeting has built upon the outcomes of the prior, culminating in a list of action steps to be taken by the TYN Management Team and Advisory Board over the coming year.



TYN Advisory Board Meeting Held on March 3rd at the Willis Conference Center in Nashville, TN

GRANTEE: The University of Tennessee Extension

PROJECT NAME: Restoration Riparian Zone Harpeth River Watershed

GRANT YEAR: FY2008

WEBSITE:

<http://utextension.tennessee.edu/Pages/default.aspx>

THE UNIVERSITY of
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Extension



The following summarizes annual activities achieved by the Restoration of Riparian Zone grant covering the period of 10/1/09 to 9/30/10.

600 trees were planted in March, followed by an application of herbicide to control unwanted vegetation. An in-service training for county agents was planned for the first week of May, however a major flood event damaged much of the fencing, thus postponing the event. Repair work on the fence occurred in mid-May. Weed control under the fencing was ongoing throughout the growing season.

In September, an in-service training was conducted with University of Tennessee Extension Agents. Nineteen were present. Included were presentations on: Nonpoint 319 Programs, fence location and construction, tree planting procedure, water quality assessment and nongame wildlife. A discussion ensued on restoring the upper portion of the demonstration area.



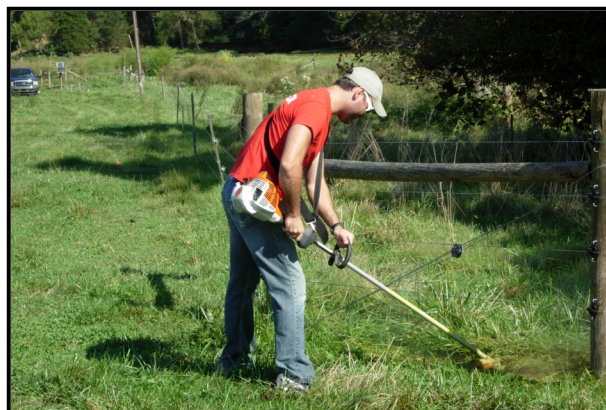
Tree seedlings are being prepared for planting.



Dr. Lane repairs a fence damaged by the flood.



Dr. Mercker explains tree planting and maintenance to the in-service participants.

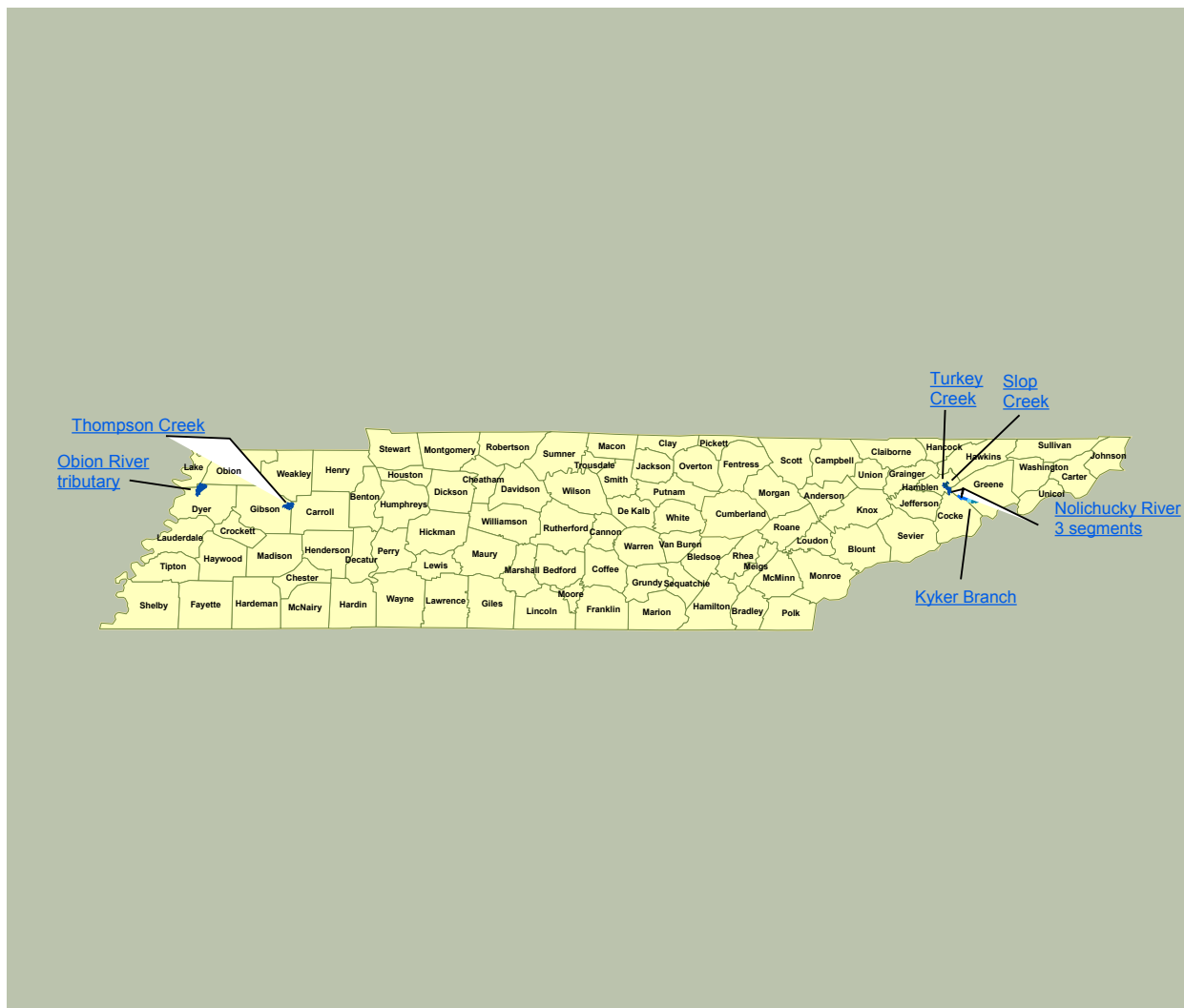


Weed control to allow proper operation of the electric fence continued through the growing season.

★ Appendix: 2010 Success Stories for Tennessee ★

These are streams delisted from the 303d list that had Success Stories published on EPA's website in 2010.

1. Kyker Branch in Greene County
2. Three sections of the Nolichucky River in Cocke, Hamblen and Greene Counties
3. An unnamed tributary to the Obion River in Dyer and Obion County
4. Slop Creek in Hamblen County
5. Thompson Creek in Carroll and Gibson Counties
6. Turkey Creek in Hamblen County





Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Implementing Agricultural Best Management Practices Improves Water Quality

Waterbody Improved

Erosion from poorly managed livestock pasture grazing areas around Kyker Branch caused increased sediment and siltation in the creek. As a result, the Tennessee Department of Environment and Conservation (TDEC) added the branch to the state's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters because of siltation and habitat alteration. Local farmers installed agricultural best management practices (BMPs) to exclude livestock from the branch and control erosion. Water quality improved as a result of the efforts, prompting TDEC to remove Kyker Branch from Tennessee's CWA section 303(d) list of impaired waters in 2008.

Problem

The Kyker Branch watershed, which empties into the Nolichucky River, is approximately 7 miles northeast of Parrottsville in Greene County, Tennessee. Erosion and runoff from poorly managed livestock pasture grazing areas caused increased sediment levels in the creek. The increased siltation caused the creek to lose its biological integrity. TDEC performed a water quality biological assessment survey in 2000 that confirmed that Kyker Branch was unable to support its designated use of aquatic life. On the basis of this information, TDEC placed 2.5 miles of Kyker Branch on the state's CWA section 303(d) list of impaired waters in 2002.

Project Highlights

Local landowners installed agricultural BMPs in the Kyker Branch watershed using grants from both the CWA section 319 program and Tennessee's Agricultural Resources Conservation Fund. With help from the Greene County Soil Conservation District, farmers installed 16,478 feet of fencing that excludes cattle from the branch (Figure 1), added three alternative watering facilities, built 1,200 feet of pipeline that carries water to new alternative watering facilities, and protected 0.1-acre of heavy-use area.



Figure 1. Landowners built fences to exclude livestock and establish a riparian zone along Kyker Branch.

Protecting heavy-use areas involves stabilizing land areas that people, animals or vehicles frequently use. For instance, the practice is applied in streams where cattle or farm equipment frequently cross, around cattle watering and feeding facilities, and in cattle feedlots and walkways. Farmers in the

area also participated in Tennessee's voluntary cost-share program and installed other BMPs that helped to control erosion and sediment. The locations and types of BMPs implemented in the Kyker Branch watershed are shown in Figure 2.

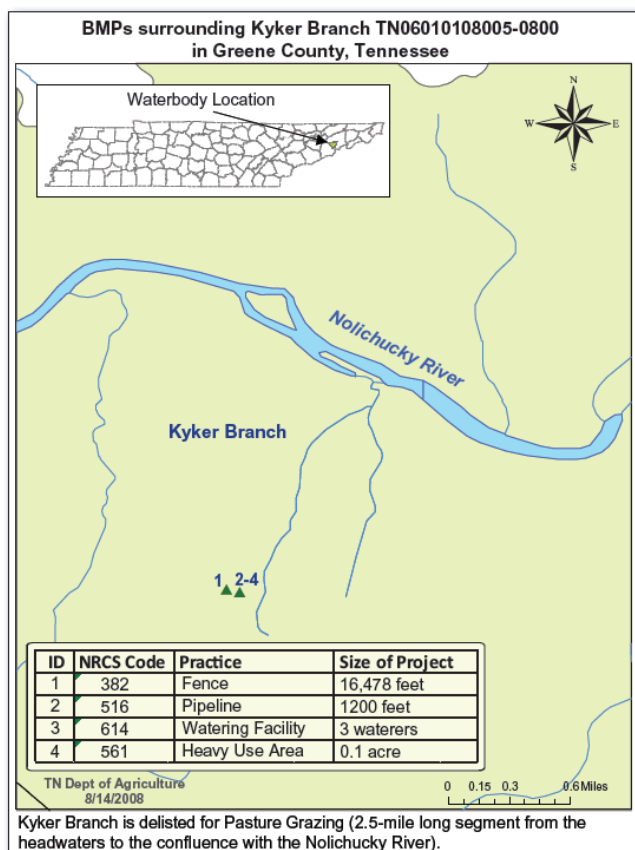


Figure 2. This map shows the location and types of BMPs installed in Kyker Branch watershed.

Results

The new BMPs are helping to control erosion, reduce siltation and restore biological integrity in Kyker Branch. To assess the restoration effort's success, TDEC established a Semi-Quantitative Single Habitat Assessment (SQSH) station at mile 0.1 at Offinger Dairy driveway in 2005–2006. SQSH is used as a measure of compliance with water quality standards for the beneficial use of fish and aquatic life. The principal metrics used are the total macroinvertebrate families (or genera); the number of families (or genera) of mayflies, stoneflies and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera); and the number of pollution-intolerant families (or genera) found in a stream. The SQSH documented 8 EPT genera and 32 total genera, earning a score of 38 out of 42 on the Tennessee Macroinvertebrate Index—a very good score. The habitat assessment also received a good score of 140 out of 200. The multiple results showed that water quality had improved, prompting TDEC to remove 2.5 miles of Kyker Branch from Tennessee's 2008 CWA section 303(d) list of impaired waters.

Partners and Funding

Kyker Branch has benefited from \$6,522 in CWA section 319 funding (including additional matching funds of \$20,828). Tennessee's Agricultural Resources Conservation Fund provided \$4,041 (plus another \$1,348 in matching funds). Key partners were the Greene County Soil Conservation District for BMP assistance and landowners for contributing the majority of the in-kind matching funds.



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Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Implementing Best Management Practices Reduces Bacteria Levels

Waterbodies Improved

Polluted runoff from agricultural lands led to high levels of *Escherichia coli* and sediment in the Nolichucky River. As a result, the Tennessee Department of Environment and Conservation (TDEC) added three segments of the Nolichucky River to Tennessee's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. Local farmers entered into the state's voluntary cost share program and installed various agricultural best management practices (BMPs). Water quality improved, prompting TDEC to remove the three Nolichucky River segments from the CWA section 303(d) list of impaired waters in 2008.

Problem

The Nolichucky River watershed drains portions of North Carolina (616 square miles) and eastern Tennessee (1,128 square miles). Major land uses in the Nolichucky River watershed are forest (61.2 percent) and pasture (28.1 percent). High levels of *E. coli* and sediment in the Nolichucky River prompted TDEC to add three segments (Figure 1) of the Nolichucky River to the CWA section 303(d) list of impaired waters in 2002.

The first segment (TN06010108001-2000) is 7.7 miles long and extends from Flat Creek to Bent Creek in Cocke and Hamblen counties. TDEC added this segment to the impaired waters list for *E. coli* from pasture grazing.

The second segment (TN06010108005-1000) is 9.4 miles long and extends from Little Chucky Creek to Evans Island in Greene County. TDEC added this segment to the CWA section 303(d) list as impaired for biological integrity from siltation.

The third segment (TN06010108005-2000) is 6.6 miles long and extends from Evans Island to Pigeon Creek in Greene and Cocke counties. TDEC added this segment to the impaired waters list for *E. coli* and biological integrity from siltation.

Bacteria levels in all three segments exceeded Tennessee's water quality standard for *E. coli*, which requires that no individual sample exceed 941 colony forming units (cfu) per 100 milliliters (mL) or 126 cfu/100 mL as a geometric mean based on a collection of five samples over a period.

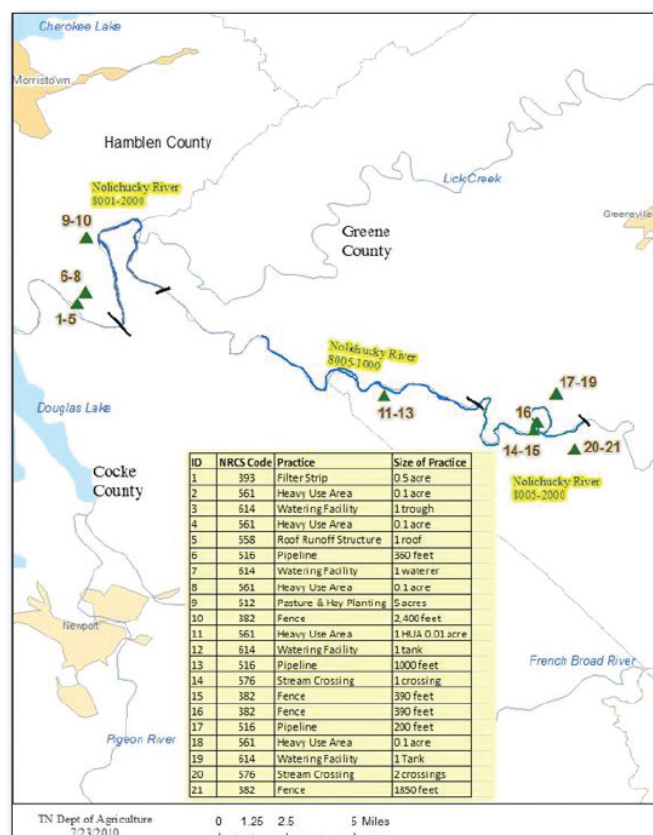


Figure 1. These three impaired Nolichucky River segments (8001-2000, 8005-1000 and 8005-2000) have been the focus of several BMP implementation projects.



Figure 2. Landowners installed heavy use area protections such as this one which prevents erosion at a stream crossing.



Figure 3. A landowner installed fencing to prevent livestock from accessing the stream and surrounding riparian areas.



Figure 4. A landowner installed this roof runoff structure (gutters and piping) to prevent stormwater from running across the bare earth of the work area.

Project Highlights

Local landowners installed numerous agricultural BMPs (see Figure 1) along all three segments of the Nolichucky River. The BMPs included planting 10 acres of pasture and hay, protecting heavy use areas (Figure 2), adding filter strips, installing fencing to exclude livestock from stream areas (Figure 3), establishing runoff structures (Figure 4) and building alternative watering facilities.

Results

Monitoring data collected from several stations along the river after BMP implementation showed *E. coli* levels to be below the state standard. For example, data collected along the 7.7-mile segment TN06010108001-2000 showed a geometric mean of 5.3 cfu/100 mL. On the basis of the data, TDEC removed the segment TN06010108001-2000 from the 2008 CWA section 303(d) list of impaired waters.

In addition, TDEC established a Semi-Quantitative Single Habitat Assessment (SQSH) to monitor the effects of the restoration activities on biological integrity. SQSH assessment is a tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. The principal metrics used are the total macroinvertebrate families (or genera) and the number of families of mayflies, stoneflies and caddisflies (collectively referred to as EPT,

which is short for the order names Ephemeroptera, Plecoptera and Trichoptera). Implementing agricultural BMPs reduced siltation and improved habitat, allowing macroinvertebrate populations to rise. Within the 9.4-mile-long segment TN06010108005-1000, SQSH documented 7 EPT genera, 16 total genera, and a habitat score of 152 out of 200, which is classified as good. Those improvements in biological integrity and attainment of fish and aquatic life uses resulted in TDEC removing the segment from the 2008 CWA section 303(d) list.

Within the 6.6-mile-long segment TN06010108005-2000, the SQSH documented 11 EPT genera and 21 total genera. Furthermore, water quality monitoring data showed that *E. coli* levels met standards, with a geometric mean of 20.8 cfu/100 mL for 13 samples and zero values exceeding 941 cfu/100 mL. A combination of low bacteria levels and improved macroinvertebrate population counts prompted TDEC to remove the segment from the 2008 CWA section 303(d) list.

Partners and Funding

Multiple funding sources helped support BMP implementation efforts. From 2003 through 2008, Tennessee contributed approximately \$20,000 through its Agricultural Resources Conservation Fund. Cocke, Greene and Hamblen county soil conservation districts used \$13,813 in CWA section 319 funding. Landowners contributed \$9,118 in matched cost-share funding.



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Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Installing Earth Embankments Improves Water Quality

Waterbody Improved

Channelization and non-irrigated crop production led to increased erosion and siltation in an unnamed tributary to Tennessee's Obion River. High sediment levels altered the substrate habitat and caused a loss of biological integrity, prompting the Tennessee Department of Environment and Conservation (TDEC) to add the 25.8-mile-long unnamed tributary to the state's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. With support from the Tennessee Agricultural Resources Conservation Fund (ARCF), local landowners installed dikes (earth embankments) along the tributary. Water quality improved, and TDEC removed the Obion River tributary from Tennessee's CWA section 303(d) list of impaired waters in 2008.

Problem

A 25.8-mile-long unnamed tributary to the Obion River flows through Tennessee's Dyer and Obion counties and the community of Miston (Figure 1). The tributary is in Northern Mississippi Alluvial Plain ecoregion 73a in northwest Tennessee. During the last century, landowners channelized sections of the Obion River and many of its small tributaries to increase flow efficiency for agricultural uses. Unfortunately, channelizing the waterways also caused increased erosion, downstream flooding, and a loss of wildlife habitat.

A 2001 macroinvertebrate survey of the unnamed tributary to the Obion River yielded a biological reconnaissance (biorecon) index score of poor. Biorecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. The principal metrics used were the total number of macroinvertebrate families (or genera), the number of families of mayflies, stoneflies and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera), and the number of pollution-intolerant families found in the stream.

The 2001 biorecon score for the unnamed tributary to the Obion River indicated that the tributary did not support its designated use of fish and aquatic life. Sediment contributed by non-irrigated crop production and channelization physically altered the substrate habitat and caused a loss of biological

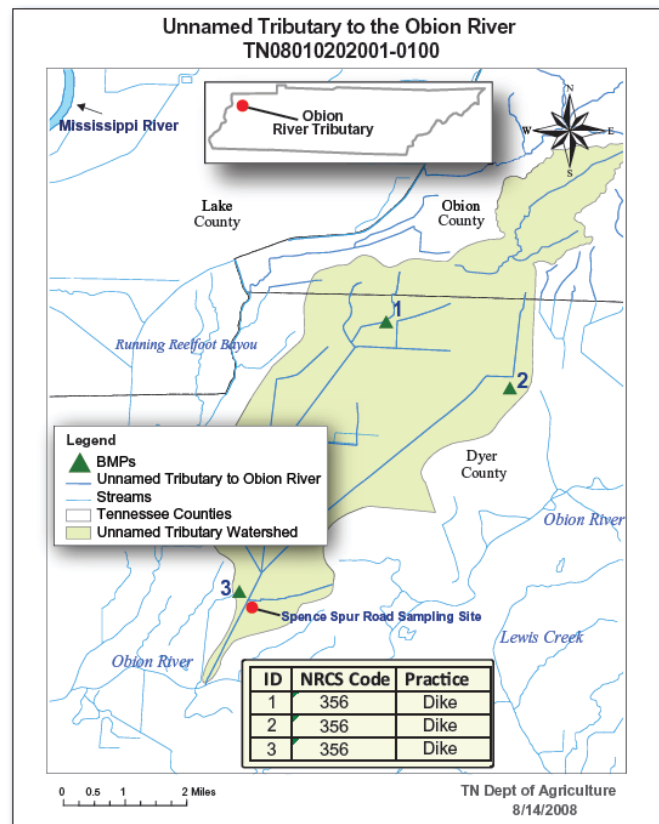


Figure 1. A 25.8-mile-long unnamed tributary flows into the Obion River in western Tennessee. Landowners installed three dikes in the watershed to reduce sedimentation from cropland.

Photo courtesy of NRCS.



Figure 2. Example of a dike, or earth embankment.

integrity. As a result, TDEC placed the unnamed tributary to the Obion River on the state's CWA section 303(d) list of impaired waters in 2002.

Project Highlights

Using funds provided by Tennessee's ARCF, local landowners installed three dikes (embankments constructed of earth and planted with crops or grass) in the unnamed tributary's watershed (see Figure 1 for project locations). One was installed in 2004 and the two others in 2005. The dikes control water levels and protect against flooding, thereby preventing damage to cropland and property (Figure 2). During the winter and spring, the dikes retain water from the cropland areas, trapping sediment and any nutrients or pesticide residues in the outflow. The water is released slowly in the spring through pipe outlets, helping to prevent further erosion.

Results

TDEC established a Semi-Quantitative Single Habitat Assessment station at mile 1.6 near Spence Spur Road and, in 2006, performed a biorecon evaluation at the station. Under the 73a biocriteria (73a is the Northern Mississippi Alluvial Plain ecoregion), the maximum biorecon score is 10. The biorecon results for the unnamed tributary to the Obion River show 1 EPT family, 18 total families, and a habitat score of 97. The unnamed tributary received a biorecon score of 8 out of 10, indicating that it now supports its fish and aquatic life use. Because these data suggest that the unnamed tributary to the Obion River now meets the standards for this subecoregion, TDEC removed the stream from the state's CWA section 303(d) list of impaired waters in 2008.

Partners and Funding

Projects for the unnamed tributary to the Obion River received \$3,295 in funding from the Tennessee ARCF, with additional matching funds of \$6,498. Key partners included the Chickasaw-Shiloh Resource Conservation and Development Council, which helped to install the dikes, and landowners, who contributed most of the in-kind matching funds.



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Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Implementing Agricultural Best Management Practices Reduces Erosion and Siltation

Waterbody Improved

Erosion from poorly managed livestock pasture grazing areas and other agricultural activities around Slop Creek caused increased levels of sediment and siltation in the creek. As a result, the Tennessee Department of Environment and Conservation (TDEC) added a 1.7-mile segment of Slop Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters because of siltation and habitat alteration. Landowners implemented agricultural best management practices (BMPs) to control erosion and restrict the cattle's access to the stream. Water quality improved, prompting TDEC to remove Slop Creek from Tennessee's list of impaired waters in 2008.

Problem

Slop Creek flows for 1.7 miles through an agricultural area just south of Morristown, Tennessee, in Hamblen County. Slop Creek is a tributary of Hale Branch, which flows into Bent Creek, which in turn empties into the Nolichucky River watershed. Pasture grazing and unrestricted livestock access to the stream altered the riparian (streamside) vegetative cover and increased siltation. Water quality biologic assessment surveys in 2000 indicated that Slop Creek did not support its designated use of fish and aquatic life, prompting TDEC to add it to Tennessee's CWA section 303(d) list of impaired waters in 2002.

Project Highlights

Local landowners installed agricultural BMPs in the Slop Creek watershed using grants from both the CWA section 319 program and Tennessee's Agricultural Resources Conservation Fund. From 2003 to 2007, landowners used section 319 funds to install 200 feet of fencing that excludes cattle from the creek, 0.5 acre of filter strip (Figure 1), three alternative watering facilities, 1,300 feet of pipeline to carry water to new alternative watering facilities, 400 feet of water diversion, and 0.1 acre of heavy-use area protection that stabilizes land areas that people, animals or vehicles frequently use (Figure 2). In 2007 landowners used Agricultural Resources Conservation Fund grants to install other BMPs including four alternative watering



Photo courtesy of Central Basin RCBD.

Figure 1. Landowners installed filter strips along the creek to capture sediment and reduce siltation.



Figure 2. Landowners installed heavy-use area protection to stabilize the land and control erosion.

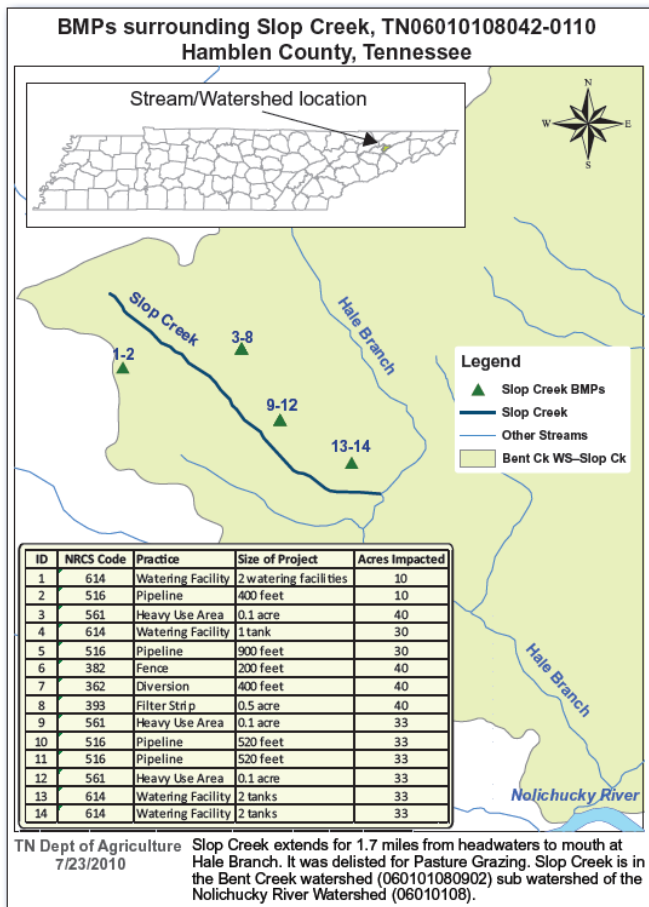


Figure 3. This map shows the location and types of BMPs installed in Slop Creek watershed.

facilities, 0.2 acre of heavy-use area protection, and 1,040 feet of pipeline. The locations and types of BMPs implemented in the Slop Creek watershed are shown in Figure 3.

Results

The new BMPs are helping to control erosion, reduce siltation and restore biological integrity in Slop Creek. In 2005 the TDEC established a Semi-Quantitative Single Habitat Assessment (SQSH) station at mile 0.1 at Slop Creek Road. SQSH is used as a measure of compliance with water quality standards for the beneficial use of fish and aquatic life. The principal metrics used are the total macroinvertebrate families (or genera); the number of families (or genera) of mayflies, stoneflies and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera); and the number of pollution-intolerant families (or genera) found in a stream. The SQSH scored 36 out of 42 on the Tennessee Macroinvertebrate Index—a very good score. The habitat assessment also received a good score of 132 out of 200. On the basis of this information, TDEC removed Slop Creek from the CWA section 303(d) list of impaired waters in 2008.

Partners and Funding

Slop Creek has benefited from \$7,975 in CWA section 319 funding (including additional matching funds of \$4,284). Tennessee's Agricultural Resources Conservation Fund provided \$4,904 (plus another \$2,658 in matching funds). Key partners were the Hamblen County Soil Conservation District for BMP assistance and the landowners for contributing the majority of the in-kind matching funds.



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Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Implementing Agricultural Best Management Practices Reduces Siltation

Waterbody Improved

Erosion on non-irrigated cropland in Tennessee's Thompson Creek watershed contributed sediment and reduced the creek's biological integrity. As a result, the Tennessee Department of Environment and Conservation (TDEC) added 20.2-mile-long Thompson Creek to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. To improve water quality, landowners installed agricultural best management practices (BMPs) that included water and sediment control basins and a runoff diversion. These BMPs improved water quality, prompting TDEC to remove Thompson Creek from the state's list of impaired waters in 2008.

Problem

The 20.2-mile-long Thompson Creek drains portions of Carroll and Gibson counties and empties into the South Fork Obion River in western Tennessee (Figure 1). Land use in the Thompson Creek watershed is primarily deciduous and evergreen forest, row crops and hay/pastureland. Numerous streams in the South Fork Obion River watershed, including Thompson Creek, have been affected by habitat alteration, which has included riparian loss and stream bank disturbances attributed to agricultural practices.

A 2001 macroinvertebrate survey of Thompson Creek yielded a biological reconnaissance (biorecon) index score of poor. Biorecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance. The biorecon index is scored on a scale from 1 to 15. A score of less than 5 is considered very poor. A score over 10 is considered good. The principal metrics used are the total number of macroinvertebrate families (or genera); the number of families (or genera) of mayflies, stoneflies and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera); and the number of pollution-intolerant families (or genera) found in a stream.

The 2001 biorecon score of poor indicated that the creek did not support its designated uses of fish and aquatic life because of non-irrigated crop production. Sediment from crop production areas resulted in a loss of biological integrity caused by siltation and alteration in streamside or littoral vegetative cover. Because Thompson Creek received a poor biorecon score in 2001, TDEC added it to the state's CWA section 303(d) list of impaired waters in 2002.

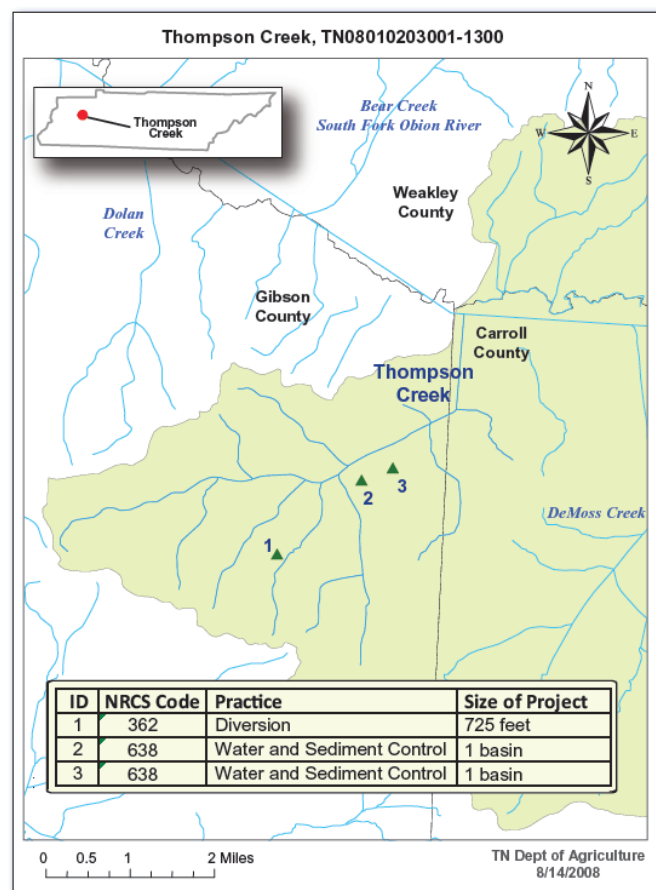


Figure 1. Thompson Creek flows into the South Fork Obion River in western Tennessee. Landowners installed several BMPs in the watershed to control erosion.



Figure 2. During a rainstorm, runoff drains across this field and collects in the water and sediment control basin seen in the background (Gibson County, Tennessee).

Project Highlights

Local landowners installed agricultural BMPs along Thompson Creek using funds provided by Tennessee's Agricultural Resources Conservation Fund, or ARCF (see Figure 1 for project locations). The BMPs include two water and sediment control basins and one 725-foot runoff diversion. The water and sediment control basins help to reduce and retain runoff, as well as trap sediment (Figure 2). The runoff diversion channels water across a slope and away from sensitive habitat areas. The channel ends at a bubble outlet (perforated pipe), which slows the runoff and releases it gradually to reduce the velocity of the flow across the ground surface (Figure 3). A sod chute below the outlet helps to stabilize the soil and prevent soil erosion.

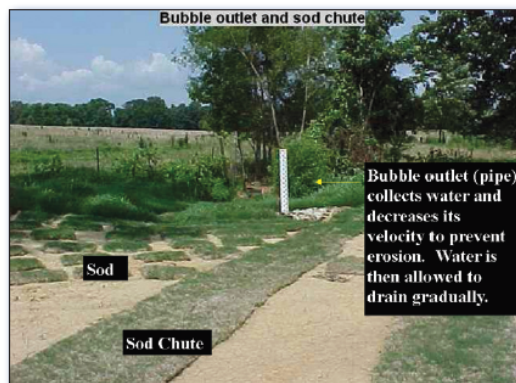


Figure 3. Water in the runoff diversion channel exits slowly through a perforated pipe and drains through the sod-covered areas (the squares of sod shown in the photo will eventually grow together).

Results

The combination of BMPs installed by landowners decreased siltation and improved water quality in Thompson Creek. In 2006 TDEC performed a biorecon evaluation along Thompson Creek at mile 3.0 (Highway 105). The results showed three EPT families, two intolerant families and 13 total families. The stream received a biorecon score of 11 (good) with a habitat score of 106, indicating that it now supports its fish and aquatic life use. On the basis of these data, TDEC removed Thompson Creek from the state's CWA section 303(d) list of impaired waters in 2008.

Partners and Funding

Projects for Thompson Creek received \$10,619 in funding from the Tennessee ARCF, with additional matching funds of \$3,540. Key partners include the soil and water conservation district offices of Gibson and Carroll counties for offering BMP assistance and landowners for contributing most of the in-kind matching funds.



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Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Tennessee

Implementing Agricultural Best Management Practices Reduces Siltation

Waterbody Improved

Erosion from poorly managed livestock pasture grazing areas caused increased sediment and siltation in Turkey Creek. As a result, the Tennessee Department of Environment and Conservation (TDEC) added the creek to the state's 2002 Clean Water Act (CWA) section 303(d) list of impaired waters because of siltation and habitat alteration. Landowners implemented agricultural best management practices (BMPs) to reduce siltation levels in the stream. Water quality improved, prompting the TDEC to remove a 5.8-mile-long segment of Turkey Creek from Tennessee's CWA section 303(d) list of impaired waters in 2008.

Problem

The Turkey Creek watershed (Figure 1) is just south of Morristown in Hamblen County, Tennessee. The 5.8-mile long creek flows through the Southern Shale Valley ecoregion, which includes intensive agricultural, urban/industrial and thick forested areas, and empties into the Nolichucky River. Erosion and runoff from poorly managed livestock pasture grazing areas caused increased sediment levels in the creek. The increased siltation caused the creek to lose its biological integrity. TDEC performed a water quality biological assessment survey in 2000 that confirmed that Turkey Creek was unable to support its designated use of aquatic life. On the basis of this information, TDEC placed a 5.8-mile segment of Turkey Creek on the state's CWA section 303(d) list of impaired waters in 2002.

TDEC completed a total maximum daily load (TMDL) study on the Nolichucky River and its tributaries (including Turkey Creek) for impairments attributed to siltation and habitat alteration. The U.S. Environmental Protection Agency, Region IV, approved the TMDL on February 26, 2008.

Project Highlights

Local landowners installed agricultural BMPs in the Turkey Creek watershed using grants from the CWA section 319 program, Tennessee's Agricultural Resources Conservation Fund (ARCF) and Tennessee's voluntary cost share program. Farmers installed 2,800 feet of fencing to exclude cattle from the creek (Figure 2), 0.2-acre of filter strip, seven alternative watering facilities, 555 feet of pipeline that carry water to new alternative

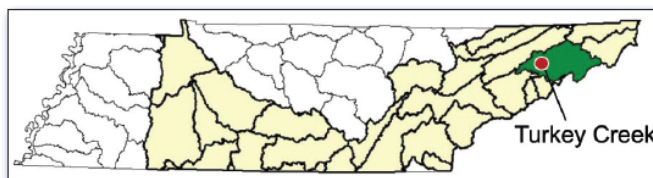


Figure 1. Turkey Creek is in Tennessee's Nolichucky River watershed, which is seen highlighted in green, above.

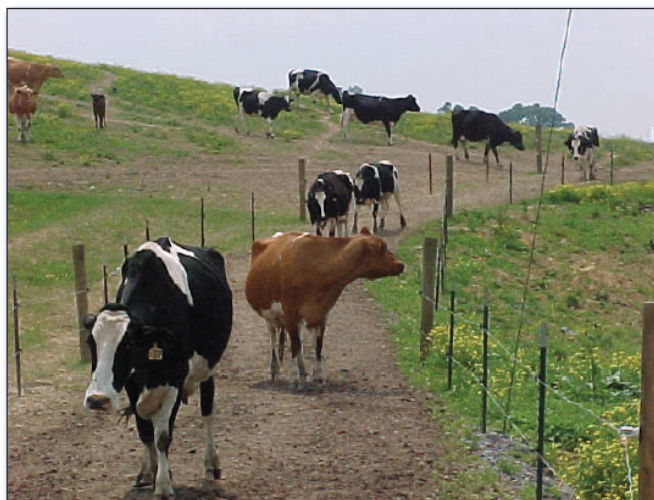


Figure 2. Turkey Creek watershed landowners built fences like this one to keep livestock away from the creek.

watering facilities, 2.5 acres of critical area planting, a 60-foot roof runoff structure, protection on more than 0.3-acre of heavy-use area, and other BMPs that control erosion and sediment. Protecting

heavy-use areas involves stabilizing land areas that people, animals or vehicles frequently. For instance, the practice is applied in streams where cattle or farm equipment frequently cross, around cattle watering and feeding facilities, and in cattle feedlots or walkways. The locations and types of BMPs implemented in the Turkey Creek watershed are shown in Figure 3.

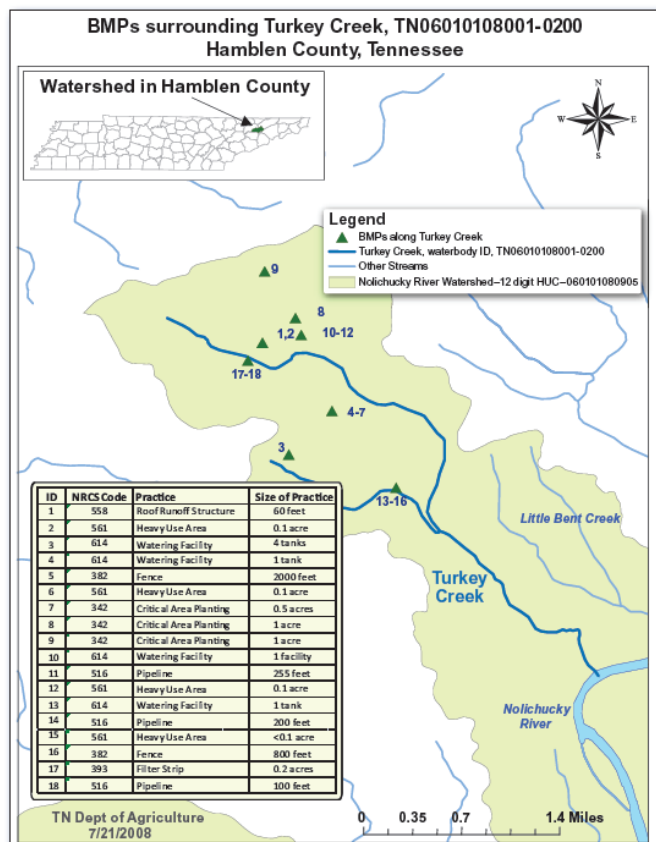


Figure 3. This map shows the location and types of BMPs installed in Turkey Creek watershed.

Results

The new BMPs are helping to control erosion, reduce siltation and restore biological integrity in Turkey Creek. To assess the restoration effort's success, TDEC established a Semi-Quantitative Single Habitat Assessment (SQSH) station at mile 0.1 at Bent Ridge Road in 2005. SQSH is used as a measure of compliance with water quality standards for the beneficial use of fish and aquatic life. The principal metrics used are the total macroinvertebrate families (or genera); the number of families (or genera) of mayflies, stoneflies, and caddisflies (collectively referred to as EPT—short for the order names Ephemeroptera, Plecoptera and Trichoptera); and the number of pollution-intolerant families (or genera) found in a stream. The SQSH documented 8 EPT genera and 28 total genera of macroinvertebrates, earning a score of 32 out of 42 on the Tennessee Macroinvertebrate Index—a good score. On the basis of these data, the TDEC removed the 5.8-mile segment of Turkey Creek from the state's 303(d) list of impaired waters in 2008.

Partners and Funding

Turkey Creek projects received funding from the CWA section 319 program (\$5,454 with additional matching funds of \$3,616) and the Tennessee ARCF (\$6,551 plus matching funds of \$7,250). The Hamblen County Soil Conservation District and Smoky Mountain Resource Conservation and Development Council provided BMP implementation assistance. Local landowners contributed the majority of the in-kind matching funds for BMPs.



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